TERI School of Advanced Studies

Department of Policy Studies

Minutes of the Board of Studies (BoS) Meeting
Held on 10th May 2019

A meeting of Board of Studies (BoS) of Department of Policy Studies (DoPS) was held on 10th May 2019 at 1.45 pm in the Conference Room of the TSAS.

Following members were present in the meeting;

1. Avanish Kumar
2. Kanchan Chopra
3. Gopal Sarangi
4. Nandan Nawn
5. Seema Sangita
6. Smriti Das
7. Sukanya Das

To facilitate the discussion the following faculty members were present in the meeting:

1. Soumendu Sarkar
2. Shantanu De Roy
3. Chandan Kumar
4. Swarup Datta
5. Kavita Sardana
6. L.N. Venkataraman

Agenda no 1. Confirmation of the minutes of the last meeting held on 25 April 2018
The minutes had been shared via email dated 13th May, 2018 to all the members. No comments were received. The minutes of the last meeting were thus confirmed.

The BoS was also apprised about the decisions of AC regarding the M.S Economics program in the meeting scheduled on 25th April 2018.

Agenda 2 and 3

New and revised syllabi were presented for consideration and approval by the members of BoS. The following suggestions were made in the meeting. (The updated syllabus incorporating these comments and the corresponding ATR is in annexure 1)

Smriti Das 12/7/19

Agenda 2a: Methods of Research in Economics (Dr. Nandan Nawn, M.Sc. Economics)

- The syllabus contains philosophy of research in first part, and then the second part has practical aspects of research – are these two balanced? How much can students assimilate both these components? Nuts and bolts of research may be more important at the Masters' level.
- Connection of tools such as econometrics, causal inference with the syllabus. Perhaps a few connections to those syllabi may be added.
- Can module 1.7 be placed elsewhere?
- In Module 7, discussion on qualitative methods seems constrained.
- The syllabus is a good mix of philosophy, skill and design, but seems heavy. Number of subtopics and readings may be too heavy for 56 hours.
- Perhaps less hours in module 8 and more hours on module 1 may be required.
- Quantitative data prior to techniques of survey; questionnaire design applicable for qualitative data as well.
- Placement of discussion on abstract may be reflected upon.
- Module 8 – break up into practical hours rather than lecture hours.
- Avoid words like academic rigour, exposure for audit/accreditation.

Agenda 2b: Natural Resource Economics (Dr. Nandan Nawn, M.Sc. Economics)

- Dr Kanchan Chopra– well designed, no more comments, just a few suggestions follow.
- Module 5 – standard reference is by Dasgupta and Karl-Goran Maler in the Handbook of Environmental Economics in India
- Theoretical challenges - issues of convexity/concavity; deep economics of shallow lake – theoretical and policy challenge.
- Faculty may reflect on the following: Module 5 – principles or dilemma in policy making?
- Too many readings – mark the essential readings.
- Along with institutions, need to discuss regulation.

Agenda 2c: Environmental Economics (Dr. Sukanya Das, M.Sc. Economics)

- What is to be covered in 1.7? How does it fit here? Need to reflect on this.
- Cost Benefit Analysis – does this include Cost Efficiency Analysis?
- Faculty may reflect on the following: Should meta-analysis come after cost benefit analysis?
- Faculty should keep freedom of choice – don't allocate just 2-3 hours for topics. It is best to allow more flexibility.
- Last module consists of cases studies – but it might be useful to develop the concepts first, i.e. how do the students understand environmental governance prior to working on cases. There may be some flexibility in the cases if an open approach is adopted.

Agenda 3a: Economics of Health and Environment (Dr. Sukanya Das, M.Sc. Economics)

Sukanya Das 12/7/19

- Course objectives needs clarity. Thorough knowledge of environmental health may be included. What does "environmental health" mean? Are we interpreting this as effect of environment on human health or the health of environment?
- Case study method might be helpful.
- Risk assessment is important

Agenda 3b: Indian Agricultural Development since Independence (Dr. Shantanu De Roy, M.Sc. Economics)

- When you talk about technology diffusion, there is a lot of literature on BT cotton. But this may not be enough for technology diffusion in agriculture. What about Green Revolution and water use?
- Where is sustainable agriculture/organic agriculture/zero budget natural farming/zero tiller – link agriculture with natural resources. Sustainability in agriculture is missing in the syllabus.
- BT cotton, and module 2 – it seems like you are taking a side. It is best for faculty to present an objective overview at Masters' level.
- Title suggestion: "since independence" could be replaced by "contemporary issues".
- Module on climate change – does not cover recent literature – add literature, for example Sandee working papers has some papers on this issue.
- Faculty may reflect on the following: Is this a perspective building exercise or an analysis?
- Faculty may reflect on the following: Production conditions or the contemporary challenges, it is suggested that both are not covered in one syllabus. If you want to do Indian agriculture development – the adaptation of farmers may be addressed. Can dispose the WTO and agriculture and focus on technology part or agriculture and environment.
- Title and content should match.
- Design – focus on content and readings, with clarity on the scope of the course.
- Course objective needs clarity. The outcome should equate with objective.

Agenda 3c: Microeconomics II (Dr. Soumendu Sarkar, M.Sc. Economics)

- Some classroom experiments may be added.
- Markets in emission trading, and understanding the volatility of these markets may be included.
- Commodity Derivative Markets may be included. Parallels between biological systems and market systems may be considered.
- The logic of increase in the hours must be explained.
- Review objectives of the course.
- Link with environment and resource economics may be considered.

Agenda 3d: Labour Economics (Dr. Shantanu De Roy, M.Sc. Economics)

- Policies of Globalization is not clear.
- Module 2: search and friction framework may be included.
- Empirical techniques like duration analysis, time use surveys.
- Overlap with Development Economics
- State related topics may be covered earlier in the course.

Shantanu Dey 12/7/19

- Module 5: no caste mentioned in the descriptions. The side headings in the modules and syllabus don't match.
- Faculty may reflect on the following: What happens after a faculty raise an argument? How to close the loop as well.

Agenda 3e: Applied Quantitative Data Analysis in Development Practice (Dr. Chandan Kumar, M.A. SDP)

- Tutorial number of hours need to be added.
- Title: Should "Development Practice" be included in the title. If included, can the different character of the development practice be explained in the objective of the syllabus.
- Terminology – elective instead of optional.
- Add formatting the results (outputs and tables) using STATA

Other Matters with the permission of Chair

- It was pointed out the categorization of courses (as new and revised courses) may be changed. Indian Agricultural Development since Independence must be treated as new course as it has a new title (and hence a new course code.)
  Action taken: This categorization is followed in Annexure 1.
- The course coordinator and instructor space must remain blank until syllabus is approved by the AC.
  Action taken: the syllabi have been edited to replace names with TBD

Sd/-

Smriti Das 12/7/19

[Smriti Das]
Chairperson, BoS, DoPS

Seema.

[Seema Sangita]
Secretary, BoS, DoPS

Annexure 1: Updated Syllabus followed by the ATRs

New Courses:

Agenda No.	Course Title	Presentation by	Program	Type of Course
2a	Methods of Research in Economics	Dr. Nandan Nawn	M.Sc. Economics	Core
2b	Natural Resource Economics	Dr. Nandan Nawn	M.Sc. Economics	Core
2c	Environmental Economics	Dr. Sukanya Das	M.Sc. Economics	Core
2d	Indian Agricultural Development since Independence	Dr. Shantanu De Roy	M.Sc. Economics	Elective

Revised Courses:

Agenda No.	Course Title	Presentation by	Program	Type of Course
3a	Economics of Health and Environment	Dr. Sukanya Das	M.Sc. Economics	Elective
3b	Microeconomics II	Dr. Soumendu Sarkar	M.Sc. Economics	Elective
3c	Labour Economics	Dr. Shantanu De Roy	M.Sc. Economics	Elective
3d	Applied Quantitative Data Analysis in Development Practice	Dr. Chandan Kumar	M.A. SDP	Elective

Course title: Methods of Research in Economics					
Course code: MPE xxx	**No. of credits:** 4	**L-T-P:** 42-4-20	**Learning hours:** 56		
Pre-requisite course code and title (if any): MPE 131 Microeconomics, MPE 121 Macroeconomics, MPE 185 Environment and Economic Development					
Department: Department of Policy Studies					
Course coordinator(s): TBD		**Course instructor(s):** TBD			
Contact details: TBA					
Course type: Core		**Course offered in:** Semester 3			
Course description Students of MSc Economics programme write a Thesis in fourth semester. This course prepares the student for the Thesis. It provides a broad exposure on various steps in conducting meaningful and grounded research in economics with a focus on ecological, environmental and resource economics, the specialization of the MSc Economics programme. In the process, it walks the students through the entire spectrum of research design, that begin with theories, concepts, frameworks and models and end with a research proposal.					
Course objectives 1. To provide the students an exposure to some stages of research in economics, from conceptualisation to proposal writing. 2. To make the students understand the significance of academic rigour, logical consistency and expositional clarity in research.					
Course content					
Module	**Topic**		**L**	**T**	**P**
1.	**Introduction** 1.1 Logical reasoning 1.2 Statement of facts 1.3 Facts – social and natural 1.4 Values -- social construction, assumptions and interpretations 1.5 Causation		12		

	1.6 Explanations--evolutionary, functional and causal 1.7 Method of scientific investigation: induction, inference, hypothetico-deductive model and falsification			
2.	**Theories, Concepts, Paradigms, Frameworks and Models** 2.1 Illustration 1: Institutional Analysis and Development Framework 2.2 Illustration 2: Socio-ecological systems	6		
3.	**Research Design: Research Problem, Research Questions and Research Method** 3.1 Goals, aims, objectives 3.2 Requirements for and of a Hypothesis 3.3 Case study method 3.4 Interdisciplinarity--potential and challenges	3		
4.	**Selected aspects of theoretical research** 4.1. Preliminaries: specification of agents, action space, state space, strategies, payoffs, assumptions 4.2. Notion of equilibrium/optimum used 4.3. Results: characterization, comparative statics, robustness 4.4. Interpretation and explanation	4		
5.	**Presentation of Research Concept Note**			8
6.	**Secondary Data** 6.1 Metadata [with illustrations from National Accounts Statistics Sources and Methods 2007 and SDG Index and Dashboards Report 2017 - Metadata] 6.2 Managing large database [with illustrations from IHDS and Cost of Cultivation Dataset] 6.3 Cleaning of data [with illustrations from IHDS and Cost of Cultivation Dataset]	3	4	
6.	**Primary data** 6.1. Type of Quantitative and qualitative data collection methods 6.2. Potential and challenges of use of qualitative data in economics 6.3. Sites of study 6.4. Framing of questions and Design of questionnaire 6.5. Conducting Field survey—issues and challenges	6		
7.	**Expressions for a proposal** 7.1. Framing of Abstract: proposals and papers 7.2. Framing of Introduction: motivations 7.3. Aligning the question with theoretical ideas and concepts 7.4. Reporting a Literature Survey or Review: meta analysis 7.5. Description of the Research Method: appropriateness, justification of choice, limitations 7.6. Listing of variables and their justification 7.7. Data to be used and collection method: sampling plan, sample size, unit of analysis, study site description, if any 7.8. Empirical Method for data analysis: prospects and limitations in answering the research question 7.9. Anticipated results: local, regional and national policy implications, if any 7.10. Matrix: linking hypothesis (if any), research design, variables, empirical method, data sources 7.11. Presentation of results: description, interpretation, implication, prescription 7.12. Professional Ethics in Research	6		

8.	**General Parameters for Assessment, Evaluation and Review** 8.1. Content, Structure and Form 8.2. Academic Rigour 8.3. Expositional clarity 8.4. Logical consistency 8.5. Integration and coherence	2		
9.	**Presentations of Proposals**			12
		42	**4**	**20**

Evaluation criteria

1. **ASSESSMENT 1**: Research Concept Note – 20% (learning outcome 2)

   Structure

   A. Title: It should capture the essential theme(s) of the proposed research. It should show clearly what is being investigated. A concise and focused title is preferred (no more than 15 words).
   B. Motivation: Provide an *account* of (a) why do you want to inquire into this specific area and (b) its relevance (ecological, economic, social, political, philosophical, policy related, legal, etc.)
   C. Research Problem: Provide a clear and simple *description* of your research problem (maximum 200 words). What does the researcher want to find out? What will be known after this research is conducted?
   D. Objectives: *Identify* overall study goals and specific research objectives (maximum 100 words)
   E. Background (a complete Literature Review is not necessary at this stage): A concise review of the main research work and current issues in the specific subject area. What is already known about this specific subject? What is/are the gap/s? Identify at least three papers whose methodology/ model you are most likely to apply. (300 words)
   F. Hypotheses/research questions to be tested or answered (maximum 25 words each).
   G. Analytical Methods: *Describe* economic theory/ies and concept/s that your work will rely on for testing hypotheses/ answering research questions (200 words)
   H. Proposed Empirical Methods, if any (100 words): *Describe* type of models, tools of analysis, etc. and justify their employment.
   I. Description of the Study Site (if any, but can be indicative), variables and data sources (100 words):

   Criteria and sub-criteria for assessment

   A. Title: Extent of focus and relevance
   B. Research Problem: expositional clarity and logical consistency in presentation
   C. Research objectives: whether clear and achievable
   D. Background: Sufficiency of description of the state of knowledge and identification of gaps
   E. Research questions/hypothesis: How interesting the questions are? How important are they? Does addressing it fills any gap in literature? Feasibility of answering them: does it require significant monetary expense, a duration of more than 9 months, access to and use of leased in equipment and materials, new technical knowledge and yet-to-be acquired skill, and access to a really large number of human subjects.
   F. Methods and data: Level of clarity on proposed methods (analytical and empirical) and approaches of data collection
   G. Integration and Coherence across different components.

   Suggested weights in total marks:

   25% each on (a) research question and (b) method and data
   10% each on (c) title, (d) research problem, (e) research objectives, (f) background, and (g) integration & coherence.

2. **ASSESSMENT 2**: Presentation of Research Proposal – 30% (learning outcome 1)

   Criteria and sub-criteria (in italics) for assessment

   A. Introduction, Problem Statement and Research Question *Relevance, Clarity, Innovativeness*

B. Literature review *Coverage, Ability to review the relevant literature, Inferences of gaps in the literature*
C. Method *Choice of method, Appropriateness of method, Comprehensive background, description and limitations of the method; Discussion of conjectures/variables/data sources/sampling strategy and questionnaire (if relevant)*
D. Expected findings/Discussion of results *Clarity on expected outcome of the project; Interpretation and implications of results (in case of final presentation*
E. Integration and Coherence *Linkages between the introduction, problem statement, research question, method, results, conclusion etc*
F. Clarity of Presentation *Audible and comprehensible; Information is presented in logical sequence; Good language skills and pronunciation; Appropriate pace of presentation*
G. Quality of visual presentation *Clarity; Organization and layout*
H. Responses during Q&A session *Response to questions and comments*

Suggested Weights in total marks:
20% each on (a) method of analysis, (b) integration & coherence and (c) clarity of presentation
10% each on (d) literature review, (e) expected findings/discussion of results, (f) quality of visual presentation and (g) responses during Q & A session.

3. **ASSESSMENT** 3: Research Proposal – 50% (learning outcome 2)

Structure

A. Abstract or a Summary of research project: a self-contained summary of the proposal with clear objective, research question/s, research method, data, and anticipated results. [400 words]
B. Research Problem: a clear and simple description of your research problem, the socio-economic and environmental context and why it is important to investigate further (your contribution in the backdrop of existing literature), and potential policy implications of your work.
C. Study Goals: identify your overall goal of the study, specific objectives /research question. You should have clearly stated single but critical and interesting research question/s to address the issue that raised in the 'Research Problem'.
D. Literature Review: an e*xhaustive* account of relevant knowledge domains. Review may be restricted to the works most pertinent to the study. You should clearly identify the research gaps and your likely contribution using latest international literature
E. Research Methods
    1. Theoretical ideas and relevant concepts: include logical/ theoretical/ behavioral model and link it with hypothesis, research question and empirical method/data
    2. Hypothesis to be tested, if any
    3. Clear indication of what variables to be used and why
    4. Data to be used and collection methods (sampling plan, sample size, unit of analysis, etc.)
    5. A description of the study site, if any
    6. Empirical methods for data analyses. It should be clearly linked with your research question, and how your proposed analysis answers the question
F. Expected Results
G. Policy implications: local, regional, or national
H. Bibliography
I. Annexure: Draft questionnaire in case primary data are to be collected.

Criteria and sub-criteria (in italics) for assessment

A. Abstract *Comprehensiveness*
B. Problem Statement and Research Question *Relevance; Clarity; Innovativeness*
C. Literature review *Coverage; Ability to review the relevant literature and Inferences of gaps in the literature*
D. Method *Choice of proposed method; Appropriateness of method; Comprehensive background, description and limitations of the method; Identification of variables and data sources (if*

relevant); Sampling strategy and questionnaire (if relevant); Formal Conjectures (if relevant)

E. Expected Findings *Clarity in the expected direction of thesis; Understanding on relevance of expected findings*

F. Integration and Coherence *Linkages between the problem statement, research question, method and expected findings*

G. List of references *Adequate use of references through-out the text; Link between list of references to text ; Citation style, both in-text and in reference*

Suggested weights in total marks:

20% each on (a) problem statement and research question and (b) method of analysis

10% each on (c) abstract, (d) introduction, (e) literature review, (f) expected findings, (g) list of references and (h) integration & coherence.

Learning Outcomes

a. Skills for making effective presentations.

b. Ability to prepare a comprehensive research proposal

Reading Materials (* = compulsory readings)

All readings are available here:

Module 1

* Mark Kanazawa. 2018. 'A brief history of knowledge and argumentation' in *Research Methods for Environmental Studies*, 15-39. London and New York: Earthscan

Mark Blaug. 1992. 'From the received view to the views of Popper', 'From Popper to the new heterodoxy, 'The distinction between positive and normative economics' in *The methodology of economics: or how economists explain*, 1-52 and 129-156. Second Edition. Cambridge: Cambridge University Press.

Fritz Machlup. 1978. Section titled 'Methodology, logic, epistemology, philosophy' and 'Why bother with Methodology' in *Methodology of Economics and Other Social Sciences*, 53-62 and 63-70. New York: Academic Press.

* John Pheby. 1988. 'Inductivism and Deductivism in Economics', 'Falsification and Economics' and 'Kuhn and Economics' in *Methodology and Economics: A critical introduction*, 1-53. London: Macmillan.

* Homa Katouzian. 1980. 'Value judgements and ideology: morality and prejudice in economic science' in *Ideology and Method in Economics*, 135-156. London: Macmillan.

M Boumans and J B Davis. 2015. *Economic Methodology. Understanding Economics as a Science* 2nd edition. Palgrave-Macmillan

Supplementary reading: Fritz Machlup. 1978. 'Homo Oeconomicus and his class mates' in *Methodology of Economics and Other Social Sciences*, 267-281. New York: Academic Press

Module2

* Edella Schlager. 2007. 'A Comparison of Frameworks, Theories, and Models of Policy Processes', in *Theories of the Policy Process* edited by Paul A. Sabatier, Colorado: Westview Press.

John M Anderies and Marco A Jansen. 2016. *Sustaining the Commons* Tempe: Center for Behavior, Institutions and the Environment, Arizona State University

* John R Wood, S Enarth and Amita Shah. 2016. 'Comparative CNRM: from concepts to field research' in *Community Natural Resource Management and Poverty in India* edited by S Enarth et al, New Delhi: Sage

V Dayal. 2014. 'Chapter 2: Models and Frameworks' in *The Environment in Economics and Development: pluralist extensions of core economic models*, 19-30. New Delhi: Springer.

* K Chopra and G Kadekodi. 1999. 'Chapter 1: Economic-Ecological Modelling—Conceptual Framework' in *Operationalising Sustainable Development: economic-ecological modelling for developing countries*, 17-41, New Delhi: Sage Publications.

* E Ostrom. 2011. 'Background on the Institutional Analysis and Development Framework' *The Policy Studies Journal* 39 (1): 7-27

Hinkel, J., P. W. G. Bots, and M. Schlüter. 2014. 'Enhancing the Ostrom social-ecological system framework through formalization'. *Ecology and Society* 19 (3): 51

Rana, Pushpendra and Daniel C. Miller. 2019. Explaining long term outcome trajectories in social–ecological systems. PLoS ONE 14(4): e0215230. https://doi.org/10.1371/journal.pone.0215230

Module 3

* Mark Blaug. 1992. 'The falsificationists, a wholly twentieth-century story' in *The methodology of economics: or how economists explain*, 83-111. Second Edition. Cambridge: Cambridge University Press

Milton Friedman. 1953. "The Methodology of Positive Economics" in *Essays in Positive Economics*, 3-46. Chicago and London: The University of Chicago Press

Fritz Machlup. 1963. "Introductory Remarks," *The American Economic Review*, 53 (2): 204

G. C. Archibald, Herbert A. Simon and Paul A. Samuelson. 1963. "Discussion," *The American Economic Review*, 53 (2): 227-236

Andreas G. Papandreou. 1963. "Theory Construction and Empirical Meaning in Economics" *The American Economic Review*, 53 (2): 205-210

Ernest Nagel. 1963. "Assumptions in Economic Theory," *The American Economic Review*, 53 (2): 211-219

Sherman Krupp. 1963. "Analytic Economics and the Logic of External Effects" *The American Economic Review*, 53 (2): 220-226

Fritz Machlup. 1978. 'Fact and Theory in Economics' and 'The problem of verification in Economics' in *Methodology of Economics and Other Social Sciences*, 101-130 and 137-157. New York: Academic Press

Daniel M. Hausman. Ed. 2008. *The Philosophy of Economics: An Anthology*. Third Edition. Cambridge: Cambridge University Press.

Mark Kanazawa. 2018. 'General research design principles' and 'The case study method' in *Research Methods for Environmental Studies*, 40-59, 182-203. London and New York: Earthscan

A L George and A Bennett. 2005. 'Phase One: Designing Case Study Research' In *Case studies and Theory Development in Social Sciences*, 73-88 Cambridge and London: MIT Press

Kevin Hoover. 2004. *The Methodology of Empirical Macroeconomics* Cambridge: Cambridge University Press

* John W Creswell and David J Creswell. 2018. 'Selection of a Research Approach' in *Research Design: Qualitative, quantitative and Mixed methods approaches*, 3-23 New Delhi: Sage [also, https://edge.sagepub.com/creswellrd5e, the companion website:]

S Lele. 2009. "Reflections on Interdisciplinarity in Environmental Economics in India" in *Handbook of Environmental Economics in India* edited by K Chopra and V Dayal, 305-325, New Delhi: OUP

Jeffrey M Wooldridge. 2003. 'Carrying out an Empirical Project' in *Introductory Econometrics: A Modern Approach*, 616-642, South-Western College Pub

Hal R Varian. 2016. "How to Build an Economic Model in Your Spare Time" *The American Economist* 61(1): 81-90

Module 4

William Thomson. 2011. "Chapter 2: Writing Papers" in *A Guide for the young economist*, 45-117. Second edition. Cambridge: MIT Press.

Hal R Varian. 1989. "What use is Economic Theory" available online at http://people.ischool.berkeley.edu/~hal/Papers/theory.pdf

Module 5

M R Saluja. 2017. 'Chapter 1: Indian and International Statistical Systems', 'Chapter 3: Agricultural Statistics', 'Chapter 12: National Accounts' and 'Chapter 14: Environmental Statistics", in *Measuring India: The Nation's Statistical System*, 1-45, 96-135, 394-454 and 488-508, Delhi: Oxford

MOSPI. 2017. National Accounts Statistics Sources and Methods 2007. New Delhi: Government of India, available online at http://www.mospi.gov.in/publication/national-accounts-statistics-sources-and-methods-2007-0

Sachs, J., Schmidt-Traub, G., Kroll, C., Durand-Delacre, D. and Teksoz, K. (2017): SDG Index and Dashboards Report 2017 - Metadata. Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN), Gütersloh and New York, available online at http://sdgindex.org/assets/files/2017/2017-SDG-Index-and-Dashboards-Report--Metadata.pdf

Module 6

Mark Kanazawa. 2018. 'Data Collection 1: Principles of Surveying' and 'Data Collection II: Interviewing' in *Research Methods for Environmental Studies*, 285-312 and 313-332. London and New York: Earthscan

Angus Deaton. 1997. *The Analysis of Household Surveys: Microeconomic Analysis for Development*

Policy. Baltimore: Johns Hopkins University Press for the World Bank.
John W Creswell and David J Creswell. 2018. 'Quantitative Methods' in *Research Design: Qualitative, quantitative and Mixed methods approaches*, 155-182, New Delhi: Sage
Priscilla Salant and Don A. Dillman. 1994. *How to Conduct your own Survey* Wiley
John W Creswell and David J Creswell. 2018. 'Qualitative methods' in *Research Design: Qualitative, quantitative and Mixed methods approaches*, 183-213, New Delhi: Sage
Martha A. Starr. 2012. 'Qualitative and mixed-methods research in economics: surprising growth, promising future" *Journal of Economic Surveys* 28 (2): 238-264

Module 7

John W Creswell and David J Creswell. 2018. 'Writing strategies and Ethical Considerations', 'The Introduction', 'The Purpose Statement', 'Research Questions and Hypotheses', 'Glossary' in *Research Design: Qualitative, quantitative and Mixed methods approaches*, 77-103, 107-121, 123-138, 139-153, 241-250. New Delhi: Sage
Mark Kanazawa. 2018. 'Ethical issues in environmental research' and 'Writing a Research Proposal' in *Research Methods for Environmental Studies,* 333-350 and 351-373. London and New York: Earthscan
William Thomson. 2011. "Chapter 3: Giving Talks" in *A Guide for the young economist*, 119-150. Second edition. Cambridge: MIT Press.
George DeMartino. 2013. "Professional Economic Ethics: Why Heterodox Economists Should Care," *Economic Thought* 2(1): 43-53
George DeMartino. 2013. "Epistemic Aspects of Economic Practice and the Need for Professional Economic Ethics," *Review of Social Economy* 71 (2): 166-186
Eric Rasmusen. 2001. "Aphorisms on Writing, Speaking, and Listening" in Readings in Games and Information edited by Eric Rasmusen, Blackwell Publishers
Paul Dudenhefe. 2009. *A Guide to Writing in Economics* available online at http://writing.ku.edu/sites/writing.drupal.ku.edu/files/docs/Guide_Writing_Economics.pdf

Module 8

Elsevier. n.d. A guide for writing scholarly articles or reviews for the Educational Research Review. Available online at https://www.elsevier.com/__data/promis_misc/edurevReviewPaperWriting.pdf
William Thomson. 2011. "Chapter 4: Writing Referee Reports" in *A Guide for the young economist*, 151-165. Second edition. Cambridge: MIT Press.
Deirdre N. McCloskey. 2019. *Economic Writing*. University of Chicago Press

Pedagogical Approach

Additional information (if any)

Useful material:

1. On presentation: Leslie Roldan available online at https://ocw.mit.edu/courses/brain-and-cognitive-sciences/9-85-infant-and-early-childhood-cognition-fall-2012/assignments/MIT9_85F12_Proposal.pdf
2. On Academic Integrity: MIT handbook for students available online at http://integrity.mit.edu/handbook/writing-original-work

Student responsibilities

Prepared by: Nandan Nawn

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3. Vikram Dayal, Institute of Economic Growth, University Enclave, North Campus, Delhi 110007; vikday@iegindia.org
4. Bharat Ramaswami, Ashoka University, Rajiv Gandhi Education City, Sonipat, Haryana 131029; bharat.ramaswami@ashoka.edu.in
5. Priya Shyamsundar, Lead Economist, Nature Conservancy, Arlington, 4245 North Fairfax Drive, Suite 100, Arlington, VA 22203-1606, USA; priya.shyamsundar@tnc.org

Comments by Board of Studies and Action Taken thereof, if any.

	Comments	Response
1.	The syllabus contains philosophy of research in first part, and then the second part has practical aspects of research– are these two balanced? How much can students assimilate both these components? Nuts and bolts of research may be more important at the Masters' level.	More hours have been allocated to the philosophical aspects, module 1, to address the 'balance'. One more reading added.
2.	Connection of tools such as econometrics, causal inference with the syllabus. Perhaps a few syllabi may be added.	Econometrics is well covered in the Programme.
3.	Increase number of hours allotted to module 1, and reduce from module 3 and 8	Addressed.
4.	Can module 1.7 be placed elsewhere?	This is core of module 1.
5.	Module 7: discussion on qualitative methods seems constrained.	Has been addressed
6.	Quantitative data prior to techniques of survey; questionnaire design applicable for qualitative data as well.	Has been addressed. There is a single module on primary data now.
7.	The syllabus is a good mix of philosophy, skill and design, but seems heavy. Number of subtopics and readings may be too heavy for 56 hours.	Agreed. Perhaps can be in a better position to address this after at least one round of teaching.
8.	Placement of discussion on abstract may be reflected upon.	It is important for the students to understand what an abstract is expected to contain, be it for a research proposal or a paper.
9.	Module 8 – break up into practical hours rather than lecture hours.	Practical hours for presentation of research concept note has been added as a new module to address the concern.
10.	Avoid words like academic rigour, exposure for audit/accreditation.	Module title and contents changed.

Course title: Natural Resource Economics			
Course code: MPE XYZ	**No. of credits:** 4	**L-T-P:** 56-0-0	**Learning hours:** 56
Pre-requisite course code and title (if any): MPE 131 Microeconomics; MPE 185 Environment and Economic Development			
Department: Department of Policy Studies			
Course coordinator(s): TBD		**Course instructor(s):** TBD	
Contact details: TBA			
Course type: Core		**Course offered in:** Semester 3	

Course description

The course lies in the intersection of disciplines of economics and environment within which economic system operates. This interlinkage can be expressed through the (a) inputs from environment to the economic system and (b) by-products of economic system to the environment. The former, or 'source' function is covered in this course. Latter, or, the 'sink' function of the environment, is covered in the Environmental Economics course that complements it.

Over the years, with the rise in the scale of economic system, its dependence on the environment for a sustained supply of inputs to sustain its own functioning have increased. There have been many conceptualisations and associated theoretical frameworks on managing and/or governing an array of natural resources, such as forests, fossil fuel aquifers, fisheries etc. to attain stated goals like efficiency in use, equity in allocation, etc. A variety of instruments have been proposed in the literature and practiced.

This course covers these aspects and attempts to connect them.

Course objectives

1. To appreciate the conceptual foundations and theoretical formulations in natural resource economics
2. To gain knowledge on the principles of governing and managing natural resources, with a focus on Indian context

Course content

Module	Topic	L	T	P
1.	**Conceptual foundations in Natural Resource Economics** 1.1 Biological growth functions 1.2 Biological yield and production functions 1.3 Optimal investment in a biotic resource 1.4 Rate of depletion of a abiotic resource 1.5 Social rate of discount and policy challenges 1.6 Non-convexities, irreversibilities and uncertainties in ecological processes and its impact on policy making	8		
2.	**Economics of Forests and Wetlands** 2.1 Growth functions and rotations 2.2 Optimal stock and maximum sustainable yield 2.3 Principles for Governing and Managing Forests 2.4 Bioeconomic models involving forests, wetlands and wildlife 2.5 Value and payment of ecosystem services 2.6 Economics of conversion of land use from forests to non-forests	10		
3.	**Economics of Fisheries** 3.1 Yield-effort function 3.2 Models of Open and regulated Access 3.3 Regulatory frameworks in governing and managing fisheries	6		
4.	**Economics of Exhaustible Resources** 4.1 Optimal extraction 4.2 Depletion, capital accumulation and backstop 4.3 Economics of managing and governing mineral extraction	8		
5.	**Some issues in policy making** 5.1 Safe Minimum Standard	6		

	5.2 Decisions on preservation, conservation and use/extraction under irreversibility and uncertainty			
6.	**Institutions for Governing Natural Resources** 6.1. Understanding and categorising institutions 6.2. Institutional Economics: variations across schools of thought 6.3. Property rights and resource regimes 6.4. Institutions in Action: typology and functioning 6.5. Institutions in Action: evaluation 6.6. Institutions in Action: outcomes	12		
7	**Presentations**			12
		50	**0**	**6**

Evaluation

1. **Test 1:** Written test (on 1-3 modules): 25%
2. **Test 2:** Presentation of a seminal paper in Natural Resource Economics: 15%

Choice: from the list supplied by the course coordinator

Structure: No presentation can exceed 20 minutes. No more than 8 slides (excluding title and references) will be used. No more than 10 minutes per presentation on Q&A. No more than two pages of handout distribution.

Criteria: Introduction; Identification of Research Question/Problem/Issue; Relevance-- either theoretically or in empirical terms or both; Clarity - Audible and comprehensible; Sequence and pace; Pronunciation and oratory skills; Organization and layout of visual presentation; Responses during Q&A session -- Clarity and sufficiency [each with equal weight]

3. **Test 3:** Written test (on 4-6 modules): 25%
4. **Test 4:** Submission of an original essay of 5,000 words: 35%

Structure: (a) which one you think is the best answer to the question pursued by you addressed in the literature survey and why, (b) what are the strongest objection(s) to your choice; (c) briefly outline what further work would be needed to provide a better answer.

Criteria: Indicators: (a) Logical consistency, (b) Academic Rigour, (c) Originality [each with equal weight]

Learning Outcomes

c. To appreciate the 'sink' function of environment, its impact on the economic system and its valuation in monetary terms (test 1)
d. To understand and assess applicability of a range of valuation methods, tools and techniques in the context of several environmental issues at local and national levels (test 1).
e. To be exposed to and learn in the process skills for making effective presentations (test 2).
f. To gain an understanding on a variety of economic instruments for addressing environmental problems (test 3)
g. To be exposed to and learn in the process skills for preparing original works (test 4)

Pedagogical Approach

– Lectures will provide an overview besides emphasizing on a few matters in each area. Students are expected to read the materials listed above but not marked compulsory to gain a better understanding. Presentations will provide opportunities for co-learning. They will complement the lectures.

Course Reading Materials (* = compulsory readings)

All readings are available here.

Module 1: Conceptual foundations in Natural Resource Economics

* J M Conrad. 2010. "Chapter 1: Basic Concepts" in *Resource Economics* Second Edition, 1-34, New Delhi: Cambridge University Press.

* Partha Dasgupta and Karl-Göran Mäler. 2009. "Environmental and Resource Economics: some recent developments' in *Handbook of Environmental Economics in India* Edited by Kanchan Chopra and Vikram Dayal. 17-66. Delhi: OUP.

* Martin S. Feldstein. 1964. "The Social Time Preference Discount Rate in Cost Benefit Analysis," *Economic Journal*, 74: 360–79

Robert M. Solow. 1974. "The Economics of Resources or the Resources of Economics," *American Economic Review*, 64: 1–15

Kenneth Arrow, Partha Dasgupta, Lawrence Goulder, Gretchen Daily, Paul Ehrlich, Geoffrey Heal, Simon Levin, Karl-Göran Mäler, Stephen Schneider, David Starrett and Brian Walker. 2004. "Are We Consuming Too Much?," *Journal of Economic Perspectives*, 18 (3): 147–172

Kenneth J. Arrow, Maureen L. Cropper, Christian Gollier, Ben Groom, Geoffrey M. Heal, Richard G. Newell, William D. Nordhaus, Robert S. Pindyck, William A. Pizer, Paul R. Portney, Thomas Sterner, Richard S. J. Tol, and Martin L. Weitzman. 2014. "Should Governments Use a Declining Discount Rate in Project Analysis?," *Review of Environmental Economics and Policy* 8 (2): 145–163

Paul A. Samuelson. 1971. "Generalized Predator-Prey Oscillations in Ecological and Economic Equilibrium," *Proceedings of the National Academy of Sciences of the United States of America* 68 (5): 980-83Arlindo Kamimura, Geraldo F. Burani and Humberto M. França. 2011. "The Economic System seen as A Living System: A Lotka-Volterra Framework," *Emergence: Complexity & Organization* 13 (3): 80-93

Karl-Göran Mäler, Anastasios Xepapadeas and Aart de Zeeuw. 2003. "The Economics of Shallow Lakes" *Environmental and Resource Economics* 26: 603–624

Supplementary reading:

Kenneth J. Arrow, Maureen L. Cropper, Christian Gollier, Ben Groom, Geoffrey M. Heal, Richard G. Newell, William D. Nordhaus, Robert S. Pindyck, William A. Pizer, Paul R. Portney, Thomas Sterner, Richard S.J. Tol, and Martin L. Weitzman. 2012. 'How Should Benefits and Costs Be Discounted in an Intergenerational Context? The Views of an Expert Panel'. Discussion paper. No. RFF DP 12-53. Washington DC: Resources for the Future.

Module 2: Economics of Forests and Wetlands

* J M Conrad. 2010. "Chapter 4: The Economics of Forestry" in *Resource Economics* Second Edition, 132-152, New Delhi: Cambridge University Press

Michael D. Bowes and John V. Krutilla. 1985. "Multiple Use Management of Public Forestlands" in *Handbook of Natural Resource and Energy Economics,* vol. II, edited by A. V. Kneese and J. L. Sweeney, 531-569 Cheltenham: Elsevier

* K Chopra and S K Adhikari. 2004. "Environment Development Linkages: modeling a wetland system for ecological and economic value," *Environment and Development Economics* 9: 19-45

* Sharachchandra Lele and Veena Srinivasan. 2013. "Disaggregated economic impact analysis incorporating ecological and social trade-offs and techno-institutional context: A case from the Western Ghats of India" *Ecological Economics* 91: 98–112V Dayal. 2007. "Social diversity and ecological complexity: how an invasive tree could affect diverse agents in the land of the tiger," *Environment and Development Economics* 12 (4): 553-71

S Lele, et al. 2013. "Ecosystem Services: Origins, Contributions, Pitfalls, and Alternatives," *Conservation & Society* 11 (4): 343-358

Erik Gómez-Baggethun, Rudolf de Groot, Pedro L. Lomas and Carlos Montes. 2010. "The history of ecosystem services in economic theory and practice: From early notions to markets and payment schemes," *Ecological Economics* 69: 1209–1218

Nicolás Kosoy and Esteve Corbera. 2010. "Payments for ecosystem services as commodity fetishism" *Ecological Economics* 69: 1228–1236

K Chopra, and P Dasgupta. 2008. 'Assessing the Economic and Ecosystem Services Contribution of Forests: Issues in Modelling, and an Illustration,' *International Forestry Review* 10 (2): 376-386

Report of the Expert Committee on Net Present Value [Chair: K Chopra] submitted to Hon'ble SC of India

M Verma, D Negandhi D, A K Wahal, R Kumar, G A Kinhal, and A Kumar. 2014. "Revision of rates of NPV applicable for different class/category of forests". Bhopal: Indian Institute of Forest Management. [selected sections]

Paul A. Samuelson. 1976. "Economics of Forestry in an Evolving Society," *Economic Inquiry* 14: 466–92

Vernon L. Smith. 1968. "Economics of Production from Natural Resources," *American Economic Review* 58: 409–32

Module 3: Economics of Fisheries

* J M Conrad. 2010. "Chapter 3: The Economics of Fisheries" in *Resource Economics* Second Edition, 75-131, New Delhi: Cambridge University Press

H. Scott Gordon. 1954. "The Economic Theory of a Common Property Resource: The Fishery," *Journal of Political Economy*, 62: 124–42

K Fuller, D Kling, K Kroetz, N Ross and JN Sanchirico. 2013. "Economics and Ecology of Open-Access Fisheries" in Encyclopedia of Energy, Natural Resource, and Environmental economics edited by J F Shorgen [Shorgen hereafter]. Volume 2, 39-49, Cheltenham: Edward Elgar.

MN Reimer and JE Wilen. 2013. "Regulated Open Access and Regulated Restricted Access Fisheries" in edited by Shorgen. Volume 2, 215-223, Cheltenham: Edward Elgar

Module 4: Economics of Exhaustible Resources

* James L. Sweeney. 1993. "Economic Theory of Depletable Resources: an Introduction" in *Handbook of Natural Resource and Energy Economics*, vol. III, edited by A. K Kneese and J.L. Sweeney, 759-854 Cheltenham: Elsevier [selected sections]

* J M Conrad. 2010. "Chapter 5: The Economics of Nonrenewable Resources" in *Resource Economics* Second Edition, 153-199, New Delhi: Cambridge University Press

Harold M. Hotelling. 1931. "The Economics of Exhaustible Resources," *Journal of Political Economy* 39: 137–75

Shantayanan Devarajan and Anthony C Fisher. 1981. "Hotellings "Economics of Exhaustible Resources: fifty years later," *Journal of Economic Literature* 19 (1): 65-73

Partha Dasgupta and Geoffrey Heal. 1974. "The Optimal Depletion of Exhaustible Resources," *The Review of Economic Studies* 41: 3-28

Geoffrey M. Heal. 1993. The optimal use of Exhaustible Resources" in *Handbook of Natural Resource and Energy Economics*, vol. III, edited by A. K Kneese and J.L. Sweeney, 855-880, Cheltenham: Edward Elgar.

J Swierzbinski. 2013. "Economics of Exploration for and Production of Exhaustible Resources" in Shorgen. Volume 2. 1-9, Cheltenham: Edward Elgar

P Mukhopadhyay and G Kadekodi. 2011. "Missing the Woods for the Ore: Goa's Development Myopia," *Economic and Political Weekly* 66 (46): 61-67

Government of India. 2019. *National Mineral Policy*. Available online at https://mines.gov.in/writereaddata/UploadFile/NMP12032019.pdf

Lekha Chakraborty, Shatakshi Garg, Gurpreet Singh. 2016. "Cashing in on Mining: The Political Economy of Mining Regulations and Fiscal Policy Practices in India." Working paper No. 161. New Delhi: National Institute of Public Finance and Policy

Module 5: Some issues in policy making

* Alan Randall and M C Farmer. 1995. "Benefits, Costs and Safe Minimum Standard for Conversation" in *Handbook of Environmental* Economics edited by Daniel W Bromley, 27-44, Oxford and Cambridge: Blackwell

John V. Krutilla. 1967. "Conservation Reconsidered" *The American Economic Review* 57 (4): 777-786

Anthony C. Fisher and John V. Krutilla, 1985, "Economics of Nature Preservation" in *Handbook of Natural Resource and Energy Economics*, vol. 1, edited by A. V. Kneese and J.L. Sweeney 165-189, Cheltenham: Elsevier

Kenneth J. Arrow and Anthony C. Fisher (1974), "Environmental Preservation, Uncertainty and Irreversibility," *Quarterly Journal of Economics*, 88: 312–19.

Module 6: Institutions for Governing Natural Resources

* Arild Vatn. 2005. "Institutions: the individual and the society", "Institutions: coordination and conflict", "Institutional Economics: different positions", "Resource Regimes" and "Evaluating Institutional change: the normative aspect of institutions" in *Institutions and the Environment*, 25-107, 252-298. Cheltenham: Edward Elgar

* John R Wood. 2016. "CNRM in India: the problem and the context" in *Community Natural Resource Management And Poverty In India: Evidence From Gujarat And Madhya Pradesh* by Shashidharan Enarth, Jharna Pathak, Amita Shah, Madhu Verma, and John R Wood, 1-16, New Delhi: Sage

* Partha Dasgupta. 2007. "Common Property Resources: Economic Analysis" in *Promise, Trust, and Evolution: Managing the Commons of South Asia* edited by R Ghate, N S Jodha, and P Mukhopadhyay, 19-50, Delhi: OUP

* S Lele, 2014. "What is wrong with Joint Forest Management" in *Democratizing Forest Governance in India*

edited by S Lele and A Menon, 25-62, New Delhi: OUP Frances Cleaver. 2012. " Getting Institutions Right: Interrogating Theory and Policy" in *Development through Bricolage: rethinking institutions for natural resource management*. London and New York: Routledge Gopal Kadekodi. 2004. "Chapter 6: Existing Institutions to Manage CPRs in India" in *Common Property Resource Management: reflections on theory and the Indian experience*, OUP, Delhi K Chopra, G K Kadekodi and M N Murty. 1989. "Peoples' Participation and Common Property Resources," *Economic and Political Weekly* 24 (51 & 52): A-175-A-189 K Chopra and G K Kadekodi. 1991. "Participatory institutions: The context of common and private property resources," *Environmental and Resource Economics* 1 (4): 353-372 B Agarwal. 2001. "Participatory Exclusions, Community Forestry and Gender: an Analysis for South Asia and a conceptual framework," *World Development* 29 (10): 1623-48 Kanchi Kohli and Manju Menon. 2014. "The Making of Forest (Re)Publics: Popular Engagement with Official Decision-making on Forest Conversions," in *Democratizing Forest Governance in India* edited by S Lele and A Menon, New Delhi: OUP Shomona Khanna. 2014. "Boundaries of Forest Lands: The Godavarman Case and Beyond," in *Democratizing Forest Governance in India* edited by S Lele and A Menon, New Delhi: OUP A Menon, V Lobo and S Lele. 2014. "The Commons and Rural Livelihoods: shifting dependencies and supra-local pressures" in *Democratizing Forest Governance in India* edited by S Lele and A Menon, 376-401, New Delhi: OUP E Ostrom. 2009. "Beyond markets and states: polycentric governance of complex economic systems", Nobel Prize Lecture HJ Albers and EJZ Robinson. "Reducing Emissions from Deforestation and Forest Degradation" in Shorgen, vol 2, 78-85, Cheltenham: Edward Elgar Harold Demsetz. 1967. "Toward a Theory of Property Rights," *American Economic Review* 57: 347–59 **Journals:** *Environmental and Development Economics*, *Ecological Economics*
Advanced Reading Material: see above
Additional information (if any) : none
Student responsibilities The students are expected to submit assignments in time and come prepared with readings when provided.

Prepared by: Nandan Nawn

Course reviewers:

1. Gopal Kadekodi, Honorary Professor, Centre for Multi-Disciplinary Development Research, Dr. B.R. Ambedkarnagar, Near Yalakki Shettar Colony, Dharwad-580004 Karnataka, India; gkkadekodi@hotmail.com
2. Pranab Mukhopadhyay, Professor, Department of Economics, Goa University, Taleigao Plateau, Panaji, Goa 403206, India; pmkolkata@gmail.com

Comments by Board of Studies and Action Taken thereof, if any.

Comments	Response
Dr. Kanchan Chopra – well designed, no more comments, just a few suggestions follow	NA
Module 5 – standard reference is by Dasgupta and Karl-Goran Maler in the Handbook of Environmental Economics in India	Reference added
Theoretical challenges - issues of convexity/concavity; deep economics of shallow lake – theoretical and policy challenge.	Reference added
Faculty may reflect on the following: Module 5 – principles or dilemma in policy making?	Module 5 retitled as Some issues in policy making
Too many readings – mark the essential readings.	Already marked
Along with institutions, need to discuss regulation.	Not possible, already the course is vast

	enough, and follows the standard structure followed elsewhere, with Indian context added.

Course title: Environmental Economics			
Course code: MPE xxx	**No. of credits:** 4	**L-T-P:** 48-8-0	**Learning hours:** 56
Pre-requisite course code and title (if any): MPE 131 Microeconomics			
Department: Department of Policy Studies			
Course coordinator(s): TBD		**Course instructor(s):** TBD	
Contact details: TBA			
Course type: Core		**Course offered in:** Semester 3	

Course description

The course lies in the intersection of disciplines of economics and environment within which economic system operates. This interlinkage can be expressed through the (a) inputs from environment to the economic system and (b) byproducts of economic system to the environment. Latter, or, the 'sink' function of the environment, is covered within this course. The former, or 'source' function is covered in the Natural Resource Economics course that complements it.

Over the years, impacts of economic system on the environment have increased; they have become qualitatively different too. The way in which environment impacts economic system have undergone both quantitative and qualitative changes. Discipline of economics have been one of first ones to recognize, appreciate and address environment related problems to human and environmental health. In the last one hundred years, the treatment has become more sophisticated, some which this course attempts to capture.

Course objectives

3. To familiarizes students with the theory and application of economics to environmental problems, in distinction with the other approaches.
4. To make the student aware of the different methods, grounded on economic theory, to assign monetary values to a variety of environmental goods and services.
5. To make the students appreciate the formulation of environmental policies involving economic instruments, associated institutions and supporting governance mechanisms.

Course content

Module	Topic	L	T	P
1.	**Property right, externalities and environmental problems** 1.1 The Human-Environment relationship 1.2 Environmental Problems and Economic Efficiency 1.3 Property Rights 1.4 Imperfect Market Structures 1.5 Externalities and Public Goods as sources of Market Failure 1.6 The Government Failure 1.7 The Pursuit of Efficiency	**3**		
2.	**Economic Principles and Overview of Valuation Methods** 2.1 Welfare Measures for Changes in Supply of Environmental Good 2.2 Environmental Values and their classification 2.3 Use Values, Non-use Values and Option Value	**3**		
3.	**Stated Preference Techniques** 3.1 Contingent Valuation Method and its applications 3.2 Choice Experiment Method and its applications	**8**		
4.	**Revealed Preference Techniques** 4.1 Household Production Function models 4.2 Travel Cost method 4.3 Hedonic Price models	**10**		
5.	**Meta- Analysis and Cost benefit Analysis** 5.1 Conducting Meta-analysis 5.2 Cost-Benefit analysis	**4**		
6.	**Economic Instruments**	**12**		

	6.1. Incentives through Market: prices through Charges and Subsidies	2		
	6.2. Incentives through Regulation: Liability Rules, Fees, Deposit-refunds	2		
	6.3. Incentives through Quantity Rationing—Tradeable Permits	2		
	6.4. Uncertainty and choice of Instruments	2		
	6.5. Market Structure, number of Players and choice of Instruments.	2		
	6.6. Evaluation of Instruments against selected criteria	1		
	6.7. Comparison of Instruments.	1		
7	**Environmental Governance: selected case studies**	**8**	**8**	
	7.1. Local Air Pollution: from stationary and non-point sources			
	7.2. Local and regional Water Pollution: from agriculture and industry			

Evaluation

5. **Test 1:** Written test (on 1-4 modules): 25%
6. **Test 2:** Presentation of a seminal paper in Environmental Economics: 15%

Choice: from the list supplied by the course coordinator

Structure: No presentation can exceed 20 minutes. No more than 8 slides (excluding title and references) will be used. No more than 10 minutes per presentation on Q&A. No more than two pages of handout distribution.

Criteria: Introduction; Identification of Research Question/Problem/Issue; Relevance-- either theoretically or in empirical terms or both; Clarity - Audible and comprehensible; Sequence and pace; Pronunciation and oratory skills; Organization and layout of visual presentation; Responses during Q&A session -- Clarity and sufficiency [each with equal weight]

7. **Test 3:** Written test (on 5-8 modules): 25%
8. **Test 4:** Submission of an original essay of 5,000 words: 35%

Structure: (a) which one you think is the best answer to the question pursued by you addressed in the literature survey and why, (b) what are the strongest objection(s) to your choice; (c) briefly outline what further work would be needed to provide a better answer.

Criteria: Indicators: (a) Logical consistency, (b) Academic Rigour, (c) Originality [each with equal weight]

Learning Outcomes

h. To appreciate the 'sink' function of environment, its impact on the economic system and its valuation in monetary terms (test 1)
i. To understand and assess applicability of a range of valuation methods, tools and techniques in the context of several environmental issues at local and national levels (test 1).
j. To be exposed to and learn in the process skills for making effective presentations (test 2).
k. To gain an understanding on a variety of economic instruments for addressing environmental problems (test 3)
l. To be exposed to and learn in the process skills for preparing original works (test 4)

Reading Materials (* = compulsory readings)

Module 1

K Singh and A Shishodia, '3. Basic Concepts and Theories: Individual Choices' and '4. Basic Concepts and Theories: Collective Choices' in K Singh and A Shishodia, *Environmental Economics: theory and application*, Sage

*T Tientenberg Chapter 2: The Economic Approach: Property Rights, Externalities, and Environmental Problems, in *Environmental and Natural Resource Economics* OR R Perman et al, Chapter 5: Welfare Economics and the Environment in *Natural Resource and Environmental Economics*

David Anderson, 'Chapter 2: Efficiency and Choice', 'Chapter 3: Market Failure', 'Chapter 4: Role of Government' in *Environmental Economics and Natural Resource Management*

Ronald H Coase, 1960, 'The problem of social cost', *Journal of Law and Economics* 3: 1-44

N Hanley, J F Shorgen and B White, 2007, *Environmental Economics in Theory and Practice* Palgrave Macmillan, 'Chapter 3: Market Failure'

* W J Baumol and W E Oates, 1988, *The Theory of Environmental Policy*, Cambridge University Press, 'Chapter 2: Relevance and the theory of externalities', 'Chapter 3: Externalities: definition, significant

types, and optimal-pricing conditions', and 'Chapter 4: Externalities: formal analysis'.
*Ayres, R. U., & Kneese, A. V. (1969). Production, consumption, and externalities. *The American Economic Review*, *59*(3), 282-297.

Module2

Markandya, A. (2014). Economic principles and overview of valuation methods for environmental impacts.
*Freeman, III, A.M. (1993): *The Measurement of Environmental and Resource Values: Theory and Methods*, Washington D. C: Resources for the Future.
*Karl-Göran Mäler, Jeffrey R. Vincent (Edited) (2005): Handbook of Environmental Economics: Valuing Environmental Changes, Volume 2, Elsevier/North-Holland, Amsterdam., 'Chapter 12 welfare theory of valuation' 'Chapter 13Environment, uncertainty and option values'
Haab, Timothy C, and Kenneth E. McConnell (2002): *Valuing Environmental and Natural Resources: The Econometrics of Non-Market Valuation*, Edward Elgar, Cheltenham, UK. Northampton MA, USA.
Per-Olov Johansson, 2000, 'Microeconomic of Valuation' in *Principles of Environmental and Resource Economics*, edited by H Folmer and H Landis Gabel, Cheltenham and Northampton: Edward Elgar
Per-Olov Johansson, 1987, *The economic theory and measurement of environmental benefits*, Cambridge: Cambridge University Press (also for module 3 and 4)
Mordechai Shechter, 2000, 'Valuing the Environment' in *Principles of Environmental and Resource Economics*, edited by H Folmer and H Landis Gabel, Cheltenham and Northampton: Edward Elgar

Module 3

*Bateman, et al (2002) *Economic Valuation with Stated Preference Techniques: A Manual*, Edward Elgar Publishing, Cheltenham.
*Whittington, D. (1998). 'Administering contingent valuation surveys in developing countries'. *World development*, *26*(1), 21-30.
Whittington, D. (2010). 'What have we learned from 20 years of stated preference research in less-developed countries?' *Annual Review of Resource Economics 2*(1), 209-236.
Hensher D.A., Rose J.M. & Greene W.H. (2005) *Applied Choice Analysis: A primer* Cambridge University Press.
*Bennett, J and R. Blamey (2001) *The Choice Modelling Approach to Environmental Evaluation*, Edward Elgar.
Bennett J., Birol, E. (2010). *Choice experiments in developing countries. implementation, challenges and policy implications*. Edward Elgar Publications Ltd.

Module 4

*Freeman, III, A.M. (1993): *The Measurement of Environmental and Resource Values: Theory and Methods*, Washington D. C: Resources for the Future.
Ward, F.A and D.J Beal (2000), *Valuing Nature with Travel Costs Models: A Manual*, Edward Elgar, Cheltenham
Viscusi (1993) 'The Value of Risk to Life and Health' *Journal of Economic Literature* 31.
Orgill-Meyer, Jennifer, Marc Jeuland, Jeff Albert, and Nathan Cutler. 2018. 'Comparing contingent valuation and averting expenditure estimates of the costs of irregular water supply' *Ecological Economics* 146: 250-264.
David Pearce, ed. (2009) *Environmental Valuation in Developed Countries: Case Studies*, Edward Elgar Publishing Ltd
M N Murty (2009): *Environment, Sustainable Development and Well-Being: Taxation, Incentives and Valuation*, Oxford University Press, New Delhi.
A E Haque, M N Murty and P Shyamsundar. (2011). *Environmental Valuation in South Asia*. Cambridge University Press.
S Kumar and D N Rao (2001). 'Valuing the benefits of air pollution abatement using a health production function a case study of Panipat thermal power station, India'. *Environmental and Resource Economics*, 20 (2), 91-102.

Case studies for module 3 and 4 [All SANDEE working papers; freely downloadable from http://www.sandeeonline.org/publicationdisp.php?pcid=1]

Revealed Preference

Irfan, M. (2013). Do Open Sewers Lead to a Reduction in Housing Prices? Evidence from Rawalpindi, Pakistan.

Das, S. (2007). Storm protection by mangroves in Orissa: an analysis of the 1999 super cyclone.

Guha, I., & Ghosh, S. (2009). A Glimpse of the Tiger: How Much are Indians Willing to Pay for It?.

Adhikari, N. Measuring Health Benefits from Air Pollution Reduction in Kathmandu Valley (No. 70)

Stated preference

Mishra, P. P. (2014). Potential Benefits and Earnings from Improving the Hussain Sagar Lake in Hyderabad: A combined revealed and stated preference approach (No. 90).

Rai, R. K., Nepal, M., Shyamsundar, P., & Bhatta, L. D. (2015). Demand for Watershed Services: Understanding Local Preferences through a Choice Experiment in the Koshi Basin of Nepal (No. id: 7292).

Rathnayake, R. W. (2015). Estimating demand for turtle conservation at the Rekawa sanctuary in Sri Lanka..

Module 5

*Borenstein, M., Hedges, L. V., Higgins, J. P., & Rothstein, H. R. (2011). *Introduction to meta-analysis*. John Wiley & Sons.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & Prisma Group. (2009). 'Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement'. *PLoS medicine*, *6*(7), e1000097.

Lindhjem, H., & Navrud, S. (2008). 'How reliable are meta-analyses for international benefit transfers?' *Ecological Economics*, *66*(2-3), 425-435.

Asian Development Bank (2013) *Cost-benefit analysis for development: A practical guide*.

R Stavins, ed., 2005, *Economics of the Environment: selected* readings, W W Norton,

Section on The Goals of Environmental Policy: economic efficiency and benefit-cost analysis

Kenneth Arrow et al, 'Is there a role for Benefit-Cost Analysis in Environmental, Health and Safety Regulation?

Steven Kelman, 'Cost Benefit Analysis: An ethical critique'

Replies to Steven Kelman from J V DeLong, R M Solow, G Butterns, J Calfee and P Ippolito

* N Hanley, 2017, Énvironmental Cost Benefit Analysis' in Shorgen et al, *Encyclopaedia of Energy, Natural Resource and Environmental Economics*, volume 3, pp. 17-24

N Hanley, 2000, 'Cost-Benefit Analysis' in *Principles of Environmental and Resource Economics*, edited by H Folmer and H Landis Gabel, Cheltenham and Northampton: Edward Elgar

Drèze, Jean, and Nicholas Stern. "The theory of cost-benefit analysis." In *Handbook of public economics*, vol. 2, pp. 909-989. Elsevier, 1987

Module 6

Tomasz Zylicz, 2000, 'Goals, principles and constraints in environmental policies' in *Principles of Environmental and Resource Economics*, edited by H Folmer and H Landis Gabel, Cheltenham and Northampton: Edward Elgar

Jean-Philippe Barde, 2000, 'Environmental policy and policy instruments' in *Principles of Environmental and Resource Economics*, edited by H Folmer and H Landis Gabel, Cheltenham and Northampton: Edward Elgar

* N Hanley, J F Shorgen and B White, 2007, *Environmental Economics in Theory and Practice* Palgrave Macmillan, Chapter 4: Incentive Design and Chapter 5: Pollution Taxes and tradable emission permits: Theory and Practice

* W J Baumol and W E Oates, 1988, *The Theory of Environmental Policy*, Cambridge University Press, Chapter 5: Uncertainty and the choice of policy instruments: price or quantity controls? and Chapter 6: Market imperfections and the number of participants

Module 7

All from Jason F Shogren et al, eds., 2013 *Encyclopedia of Energy, Natural Resource and Environmental Economics*, Volume 3, London and San Diego: Elsevier

JB Braden and JS Shortle, 2013, 'Agricultural Sources of Water Pollution', pp. 81-85 E Lichtenberg, 2013, 'Economics of Pesticide Use and Regulation', pp. 86-97 SL Stafford, 2013, 'Hazardous Substances', pp. 98-102 AM Bento, 2013, 'Local/Regional Air Pollution from Stationary Sources', pp. 103-108 D Earnhart, 'Water Pollution from Industrial Sources', pp. 114-120 MA Cohen, 'Water Pollution from Oil Spills', pp. 121-126 M Walls, 2013, 'Deposit-Refund Systems in Practice and Theory', pp. 133-137 JS Shortle and JB Braden, 'Economics of Nonpoint Pollution', pp. 143-149 C Bo¨ hringer and A Lange, 'European Union's Emissions Trading System', pp. 155-160 I Parry, 'Green Tax Design in the Real (Second-Best) World', pp. 161-168 R Innes, 'Liability Rules and the Environment', pp. 169-184 K Segerson, 'Price Instruments', pp. 185-192 T Requate, 'Prices versus Quantities', pp. 193-203 J Rubin and S Siriwardena 'Quantity Instruments', pp. 204-211 GE Helfand, 'Standards', pp. 217-221 S Kallbekken, 'Public Acceptability of Incentive-Based Mechanisms', pp. 306-312
Pedagogical Approach Lectures will provide an overview besides emphasizing on a few matters in each area. Students are expected to read the materials listed above but not marked compulsory to gain a better understanding. Presentations will provide opportunities for co-learning. They will complement the lectures.
Additional information (if any): none
Student responsibilities The students are expected to submit assignments in time and come prepared with readings when provided

Prepared by: Sukanya Das and Nandan Nawn

Reviewers:

1. Prof M.N Murty, Retired Professor, Institute of Economic Growth, Visiting Professor, TERI School of Advanced Studies
2. Prof R.N Bhattacharya, Honorary Adjunct Professor of Economics, School of Oceanographic Studies, Jadavpur University, Kolkata-700032.

Comments by Board of Studies and Action Taken thereof, if any.

Comments	Response
1. What is to be covered in 1.7? How does it fit here. Need to reflect on this.	The Pursuit of Efficiency will cover Private Resolution through Negotiation—Property, Liability, and the Coase Theorem , Legislative and Executive Regulation
2. Cost Benefit Analysis. – does this include Cost efficiency analysis.	Cost effectiveness is not covered here
3. Faculty should reflect on this: Should meta-analysis come after cost benefit analysis.	For reflection, no action required.
4. Faculty should keep freedom of choice – don't put 2-3 hours for topics. It is best to allow more flexibility.	The internal lecture hours can be made flexible while we start teaching for the course
5. Last module consists of case-studies – but it might be useful to develop the concepts first, i.e. how do the students understand environmental governance prior to working on cases? There may be some flexibility in the cases if an open approach is adopted.	Case studies already incorporated in the list of references

Course title: Indian Agricultural Development: Contemporary Issues			
Course code: MPE XXX	**No. of credits:** 4	**L-T-P:** 56-0-0	**Learning hours:** 56
Pre-requisite course code and title (if any): None			
Department: Department of Policy Studies			
Course coordinator: TBD	**Course instructor** TBD		
Contact details:			
Course type: Elective	**Course offered in:** Semester 3		

Course description:

The course will discuss changes in the trajectory of agricultural development in India since Independence. Students will be exposed to impacts of policies on the growth processes in Indian agriculture. Further, it discusses changes in the relations among economic agents involved in the process of production and exchange that vary with the levels of capitalist development across agro-ecological zones. It also provides an exposure to the role of agricultural markets in facilitating the process of exchange.

Students will be acquainted with the impacts of some technological developments in Indian agriculture across social and economic groups, with a focus on the access, utilisation and sustainability of Green Revolution and BT cotton. Sustainability of farming practices will be discussed in this course, with specific illustrations from the literature on impacts of climate change and adaptation strategies of different sections of producers.

Liberalisation of economic regime that started in 1991 was followed by major structural changes resulting modifications in the state provision of support to domestic agricultural sector—it had serious impacts on livelihood security of different sections of rural population, which the course covers as well.

Course objectives:

-To understand the growth processes in Indian agriculture.

-To understand the nature of development of Indian agriculture, the role of agriculture in industrial development and land distribution in rural India.

-To understand inter-linkages across input and output markets in agriculture.

-To understand selected aspects of sustainability of agricultural development in India.

-To identify the impacts of climate change in Indian agriculture and adaptation strategies thereof.

-To understand the impacts of economic reforms on Indian agriculture.

Course content

S. No	Topic	L	T	P
1	**Module 1. Growth and Policies** -Growth Process -Selected Policy Level Interventions on the growth process In this module the performance of Indian agriculture and policy interventions at different phases since Independence will be discussed. This module will enable students to understand the development trajectory of Indian agriculture since Independence.	8		
2	**Module 2. Production Relations in Indian Agriculture** -Mode of Production in Indian Agriculture -Role of agriculture in industrial development -Tenancy Relations and the Issue of Land in Rural India This module enables a student to understand the nature of and processes involved with capitalist development and identifying the beneficiaries (and non-beneficiaries) of such processes. It will showcase that farmers in India are not homogenous entities and they differ in terms of capital base, access to finance and terms and conditions under which they participate in the processes of production. Further, it enables the students to identify the different sections of farmers, economic relations between them in the process of production and to analyse the sections among the farmers that had benefited (and not benefited)	10		

	from the growth process of Indian agriculture. Indian economy is primarily agrarian, and nature of agricultural development has a strong bearing on industrial development. In other words, constraints faced by the former in terms of growth rate and in terms of distributing the benefits of growth process to substantial sections of the rural population, will retard industrial development in such an economy. These matters are discussed in this module. Land is an important component in the production process of agriculture. Land distribution in India has always been uneven. An important outcome of uneven distribution of land has been the existence of tenancy relationships, across agro-ecological zones in India, that are extremely skewed in favour of the big landholders. However, there have been attempts, in certain regions in India, for equitable distribution of land. Land reform, a programme intended to create private property rights over land, has been discussed in this module. Also, the overall impact of land reform on the rural areas, the limitations of such a programme has been discussed.			
3	**Module 3. Exchange Relations in Indian Agriculture** -Contract Farming and Interlinkages Across Markets -Role(s) of Agricultural Markets Exchange relations encompass relations between different sections of the producers in the sphere of exchange. The module exposes the students to the issue of interlinkages across input and output markets in an agrarian economy. This module provides exposure to the linkages between credit, labour and output markets and the terms and conditions under which different sections of the producers participate in the process of exchange. It also analyses that how unequal access to resources also leads to variations in the terms of exchange for different sections of producers.	7		
4	**Module 4. Technology diffusion in Indian Agriculture: Issues of Ecological Sustainability** -Green Revolution and Sustainable Agricultural Development -Implementation of BT Cotton Technology and its Impacts -Sustainability of Farming Practices in India This module intends to bring into discussion issues of sustainability of agricultural development due to technological changes at various points in time. More specifically, it discusses ecological sustainability of Green Revolution technology and impacts of technological development in Indian agriculture on natural resources like water and land. Sustainability of BT Cotton technology in India, a widely debated issue in Indian agriculture at the policy level, will be discussed in this module. It will also provide a critical take on one of alternative farming practices, Zero Budget Natural Farming for promoting sustainability of Indian agricultural development.	12		
5	**Module 5. Climate Change and Indian Agriculture: Impacts and Adaptation Measures** This module intends to discuss impacts of climate change on Indian agriculture. It gives a detailed exposure to the students regarding the impact of climate change on yield and productivity of several major crops and on irrigation sources in India. It also aims to discuss the adaptation measures and determinants of adaptive capacity of the farming community in India to cope with the problems	9		

	related to climate change.			
6	**Module 6. Economic Reforms and Indian Agriculture** Initiation of reforms in the nineteen nineties marked a new phase of development in the Indian economy. It had led by major changes in macroeconomic policies in India; trade liberalization in agriculture and accession into the WTO were integral parts of these changes. This module intends to discuss impacts of economic reforms in agriculture since the nineties. The issue of agrarian distress will also be discussed in this module.	10		
	Total	**56**		

Evaluation criteria:

1. **Test 1: Written test** [at the end of teaching of module 1] — 20% [learning outcome 2]
2. **Test 2: Submission of a term paper** [at the end of teaching of modules 2 and 3] – 25% [learning outcome 1]
   Students will be asked to write an essay (in 2000 words) on a given topic. They will be assessed based on (a) answering the question, (b) maintaining word limit, (c) in-depth understanding of the topic, (d) strength of argument, (e) clarity of argument and (f) proper referencing.
3. **Test 3: Presentation** [after the completion of module 5] – 25% [learning outcomes 1 and 2]
   There will be individual presentation of students based on the topics covered in the course. Topic(s) will be selected by the students; it will be related to the modules covered in the course.
4. **Test 4: Written test** [at the end of the semester, entire syllabus] – 30% [learning outcomes 1 and 2]

Learning outcomes:

By the end of the course, students will:

1. Develop critical understanding regarding growth processes in Indian Agriculture.
2. Command an understanding regarding the nature and beneficiaries of development, agriculture-industry development linkages and land distribution in rural India.
3. Develop understanding regarding sustainable farming practices in agriculture.
4. Assess the impacts of climate change on Indian agriculture.
5. Develop critical understanding regarding the impacts of economic reforms on Indian agriculture.

Pedagogical approach

-Critically investigates policy level and climatic impacts on various socio-economic classes and social and religious groups in rural India.
-Class interactions and discussions.
-Class presentations.

Materials:

Optional textbooks:

Patnaik, Utsa (ed.) (1990), *Agrarian Relations and Accumulation: The Mode of Production Debate in India*, Oxford University Press.
Ramachandran, V. K. and Swaminathan, M. (eds.) (2002), *Agrarian Studies: Essays on Agrarian Relations in Less-Developed Countries*, Tulika Publishers.
Mohanty, B. B. (ed.) (2016), *Critical Perspectives on Agrarian Transition: India in the Global Debate*, Rouledge.
Campling, Liam et. al. (eds.) (2013), *Journal of Agrarian Change: Special Issue*, July, 13(3).

Reading materials:

Module 1: Growth and Policies

1.1 Growth Process

Mohan Rao, J. and Storm, Servaas (1998), "Distribution and Growth in Indian Agriculture", in Byres, Terence J.(ed.), *The Indian Economy: Major Debates since Independence*, OUP.
De Roy, Shantanu (2018), "Economic Reforms and Agricultural Growth in India", in *Quarter Century of Liberalization in India: Looking Back and Looking* Ahead, Oxford University Press, New Delhi.
[Through these readings, students will be able to understand the growth performances of Indian agriculture during the pre- and post-reform periods.]

1.2 Policy Level Interventions

Bharadwaj, Krishna (1994), Agricultural Policies for Growth: The Emerging Contradictions, in Byres, T. J. (ed.), *The State, Development Planning and Liberalisation in India*, OUP. New Delhi.
Dev, Mahendra S and Rao, Chandrasekhara N (2010), "Agricultural Price Policy, Farm Profitability and Food Security", *Economic and Political Weekly*, June 26, 45(26/27)
[Discusses policy level impacts on the growth process during the pre- and the post-reform periods.]

Module 2: Production Relations in Indian Agriculture

2.1 Mode of Production Debate in Indian Agriculture

Patnaik, Utsa (1991), *Agrarian Relations and Accumulation: The Mode of Production Debate in India* (Chapters 5,6 and 7), OUP, 1990.
[Captures debates on the modes of production in India.]

2.2 Role of Agriculture in Industrial Development

Patnaik, Utsa (1986), "The Agrarian Question and Development of Capitalism in India", *Economic and Political Weekly*, May, 21(18).
Yadu, C. R. and Satheesha, B. (2016), "Agrarian Questions in India: Indications from NSSO's 70th Round", *Economic and Political Weekly*, 51(16).
[Analyses the role of agriculture in the industrialisation process in India.]

2.3 Tenancy Relations and the Issue of Land in Rural India

Rawal, Vikas (2008), "Ownership Holdings of Land in Rural India: Putting the Record Straight", *Economic and Political Weekly*, March, 43(10).
De Roy, Shantanu (2016), "Changes in the Distribution of Cultivated Land and Occupational Pattern in Rural West Bengal", *Indian Journal of Agricultural Economics,* October-December 71(4).
Rawal, Vikas (2013) and Siddiqur, Osmani, "Economic Policies, Tenancy Relations and Household Incomes: Insights from Three Selected Villages in India", ICSSR-ESRC Bilateral Collaboration Programme for Exchange of Scholars.
[Captures socio- political and economic issues related to land in the context of an agrarian economy like India.]

Module 3: Exchange Relations in Indian Agriculture

3.1 Contract Farming

Singh, Sukhpal (2002), "Contracting Out Solutions: Political Economy of Contract Farming in the Indian Punjab", *World Development*, September, 30(9).
Mahendra Dev, S. and Chandrasekhara Rao, N. (2005), "Food Processing and Contract Farming in Andhra Pradesh: A Small Farmer Perspective", *Economic and Political Weekly*, June-July, 40(26).
[Argues that unequal production relations are the basis of unequal relations of exchange.]

3.2 Agricultural Marketing in India

Ali, Muhamad Jan, and Barbara Harris White (2012), "Three Views About Agricultural Commodity Markets", *Economic and Political Weekly*, December 47(52).
[Analyses interlocked nature of markets in the rural economies and the process of surplus realization.]

Module 4: Technology Diffusion in Indian Agriculture: **Issues of Ecological Sustainability**

4.1 Green Revolution and Sustainability of Agricultural Development

Singh, R. B. (2000), "Environmental Consequences of Agricultural Development: A Case Study from the Green Revolution State of Haryana, India", *Agriculture, Ecosystems and Environment*, December, 82(1-3).
Chand, Ramesh (1999), "Emerging Crisis in Punjab Agriculture", *Economic and Political Weekly*, March-April, 34(13)
[These papers discuss impact of Green Revolution on natural resources like water, land and environment. These papers also bring into focus the issue of environmental sustainability of Green Revolution technology in India.]

4.2 Implementation of BT cotton Technology in India and its Impacts

Glover, Dominic (2010), "Is BT Cotton a Pro-Poor Technology? A Review and Critique of the Empirical Record", *Journal of Agrarian Change*, 10(4).
Ramakumar, R, Raut, Karan and Kamble, Tushar (2017), "Moving Out of Cotton: Notes from a Longitudinal Survey in Two Vidarbha Villages", *Review of Agrarian Studies*, January to June, 7(1).
Krishna, Vijesh V, and Qaim, Martin (2012), "BT Cotton and Sustainability of Pesticide Reductions in India", *Agricultural Systems*, Vol. 107.

[Discusses merits and demerits of BT cotton technology in India and its impacts on different sections of the producers.]

4.3 Sustainable Farming Practices in India

Khadse, Ashlesha et al (2017), "Taking Agroecology to Scale: The Zero Budget Natural Farming Peasant Movement in Karnataka, India", *The Journal of Peasant Studiesi,* February,45(1).
Patil, Sheetal et al (2014), "Comparing Conventional and Organic Agriculture in Karnataka , India: Where and When can Organic Farming be Sustainable?', *Land Use Policy*, Vol.37,
[These readings bring into discussion alternative farming practices, and conditions under which these practices can promote sustainable development.]

Module 5: **Climate Change and Indian Agriculture: Impacts and Adaptation Strategies**

Saravanakumar, V. (2015), "*Impacts of Climate Change on Yield of Major Food Crops in Tamil Nadu, India*", SANDEE Working Paper No. 91-15.
Balasubramanian, R. (2015), "*Climate Sensitivity of Groundwater Systems Critical for Agricultural Incomes in South India*", SANDEE Working Paper No. 96-15.
Banerjee, Rupsha R. (2015), "Farmer's Perception of Climate Change, Impact and Adaptation Strategies: A Case Study of Four Villages in the Semi-Arid Regions in India", *Natural Hazards*, 75(3).
[Discusses impacts of climate change on Indian agriculture and adaptation strategies by the farmers.]

Module 6: **Economic Reforms and Indian Agriculture**

Nayyar, Deepak and Sen, Abhijit (1994), "International Trade and the Agricultural Sector in India", *Economic and Political Weekly*, May, 29(20).
Gulati, Ashok (2002), "Indian Agriculture in a Globalising World", *American Journal of Agricultural Economics*, August, 84(3).
Patnaik, Utsa (2003), *Global Capitalism, Deflation and Agrarian Crisis in Developing Countries*, Working Paper no. 15, UNRISD.
Patnaik, Utsa (2004), "The Republic of Hunger", *Social Scientist*, September-October, 32(9/10).
[Discusses the rationale for economic reforms on Indian agriculture and impacts of India's accession in the WTO on the rural economy.]

Additional information (if any):

Student responsibilities: Attendance, feedback, discipline: as per university rules.

Course reviewers:

Prof. R. Ramakumar, Tata Institute of Social Sciences, Mumbai.
Prof. Vikas Rawal, Jawaharlal Nehru University, New Delhi.

Prepared by: Dr. Shantanu De Roy

Comments by Board of Studies and Action Taken thereof, if any.

Comments	Response
1. When you talk about technology diffusion, there is a lot on bt cotton. But this may not be enough for technology diffusion in agriculture. What about Green Revolution and water use?	Suggestions have been accepted, and changes were made in Module 4. Following changes have been made in Module 4. Changed Title of the module: Technology Diffusion in Indian Agriculture: Issues of Ecological Sustainability. The number of lecture hours for this module has been increased to 12.
2. Where is sustainable agriculture/organic agriculture/zero budget natural farming – link agriculture with natural resources? Sustainability in agriculture is missing in the syllabus.	In view of the comments, Modules 4.1 (Green Revolution and Sustainable Agricultural Development) and 4.3 (Sustainable Farming Practices in India) have been incorporated.
3. BT cotton, and module 2 – it seems like you are taking a side. It is best for faculty to present an objective overview at a Masters' level.	Impacts of BT cotton technology in India has been discussed in Module 4.2. Three papers have been used in Module 4.2. The paper by Dominic Glover (Is BT Cotton a Pro-Poor Technology? A Review and Critique of the Empirical Record) has been widely cited in the literature. One of the main arguments/findings of this paper is that the benefits of implementing BT cotton technology in terms of use of pesticides or productivity gains is *neither uniform across farmers nor context-independent.* In my humble opinion, this paper desists from taking any side in these senses.

	Two additional readings, based on primary data collected from villages in different agro-ecological zones, lead credence to the argument mentioned above. The paper by Ramakumar et al (Moving Out of Cotton: Notes from a Longitudinal Survey in Two Vidarbha Villages) traces out the reasons for cropping pattern shifts whereby farmers were shifting their land use from cotton to other food crops ostensibly because of economic constraints. On the contrary, the second paper by Krishna and Qaim (BT Cotton and Sustainability of Pesticide Reductions in India, newly incorporated) shows positive impacts of BT cotton technology in terms of sustainable pesticide reductions and yield gains in India. Module 2 discusses nature of development of Indian agriculture, beneficiaries of the development process, agricultural-industry development linkages and the importance of land in the production process. In my humble opinion, these are realities of Indian agriculture and students should get exposures to these issues. In other words, this Module intends to give objective analysis of some of the realities and issues of Indian agriculture. The Module has *not* been designed to take 'a side'. This module enables the students to understand the nature of and processes involved with capitalist development and identifying the beneficiaries (and non-beneficiaries) of such processes. It will showcase that farmers in India are not homogenous entities and they differ in terms of capital base, access to finance and terms and conditions under which they participate in the processes of production. Further, it enables the students to identify the different sections of farmers, economic relations between them in the process of production and to analyse the sections among the farmers that had benefited (and not benefited) from the growth process of Indian agriculture. Indian economy is primarily agrarian, and nature of agricultural development has a strong bearing on industrial development. In other words, constraints faced by the former in terms of growth rate and in terms of distributing the benefits of growth process to substantial sections of the rural population, will retard industrial development in such an economy. These matters are discussed in this module. Land is an important component in the production process of agriculture. Land distribution in India has always been uneven. An important outcome of uneven distribution of land has been the existence of tenancy relationships, across agro-ecological zones in India, that are extremely skewed in favour of the big landholders. However, there have been attempts, in certain regions in India, for equitable distribution of land. Land reform, a programme intended to create private property rights over land, has been discussed in this module. Also, the overall impact of land reform on the rural areas, the limitations of such a programme has been discussed.

4. Title suggestion: instead of "since independence" – some issues at present/contemporary issues.	As suggested, the title of this course has been changed to Indian Agricultural Development: Contemporary Issues
5. Module on climate change – does not cover recent literature – add literature, for example Sandee working papers.	Three papers have been incorporated. (a) Impacts of Climate Change on Yield of Major Food Crops in Tamil Nadu, India (V. Sarvanakumar) (b) Climate Sensitivity of Groundwater Systems Critical for Agricultural Incomes in South India (R. Balasubramanian) (c) Farmer's Perception of Climate Change, Impact and Adaptation Strategies: A Case Study of Four Villages in the Semi-Arid Regions in India (Rupsha R. Banerjee)
6. Faculty may reflect on the following: Is this a perspective building exercise or an analysis?	The course is primarily analytical in nature. Students may as well develop view points regarding impacts of economic policies, technological diffusion and climate change on Indian agriculture.
7. Faculty may reflect on the following: Production conditions or the contemporary challenges, it is suggested that both are not covered in one syllabus. If you want to do Indian agriculture development – the adaptation of farmers may be addressed. Can dispose the WTO and agriculture and focus on technology part or agriculture and environment.	The title of this module has been changed to, Economic Reforms and Indian Agriculture. Changes in development trajectory with the initiation of economic reforms in the early 1990s have profound impacts on production conditions in Indian agriculture. Thus, production conditions and contemporary challenges are inextricably related to each other. Agricultural trade liberalization and India's accessions into the WTO have been important components of economic reforms in India. These are contemporaneous in nature and the process is on-going. In my humble opinion, disposing this section will prevent students to understand and analyse some of the fundamental factors in terms of explaining the current and extremely important phenomenon of agrarian distress that had engulfed vast parts of the Indian countryside. A course on Agricultural Development in India is incomplete if these contemporary developments of Indian agriculture are not included in the syllabus. Hence, this module should be considered as an integral part of this course. In view of the changes made in Modules 4 and 5, in terms of lecture hours, 10 hours have been allotted for Module 6.
8. Title and content should match.	This has been taken care of in the revised outline.
9. Design – focus on content and readings, but you can use objectives to define the scope of the syllabus.	This has been taken care of in the revised course outline.

10. Course objective needs clarity – bullet points. The output should equate with objective.	This has been taken care of in the revised course outline.

Course title: Economics of Health and Environment			
Course code: MPE XXX	**No. of credits:** 4	**L-T-P:** 41-13-4	**Learning hours:** 56
Pre-requisite course code and title (if any): Microeconomics (MPE 131)			
Department: Department of Policy Studies			
Course coordinator: TBD	**Course instructor** TBD		
Contact details:			
Course type: Elective	**Course offered in:** Semester 3		

Course description:

This course introduces students to environment – health linkages and underscores the health outcomes related to exposure to air and water pollution other toxic substances, variations in the climate and food and energy sources, and environmental policy. It helps to build up the key concepts and applying tools and techniques of economic evaluation of life and health and associated health care markets.

Upon completion of the course, students would have gained knowledge about the methods, data sources, and models and specifications used in analysis of environment and health from an economist's perspective.

Course objectives

1. To provide students with a thorough knowledge of concepts on environmental health impacts.
2. To decide whether a particular evaluation is necessary for quantifying environmental pollution and choose the appropriate technique and undertake analysis.
3. Apply economic tools appropriately to analyze issues in health care and public health
4. Develop a critically constructive style of analysis of issues in health care organization, delivery, and financing, as well as health policy.
5. Integrate current literature on economic concepts, methods, and applications to issues in health care and public health.

Course content

Module	Topic	L	T	P
1	**Introduction to environmental health** 1.1 Environment-human interaction 1.2 Environmental impact on human health 1.3 Exposure, dose, response 1.4 Risk assessment and management	4	1	0
2	**Economic evaluation of health** 2.1 The relevance of health economics 2.2 Approaches to the economic evaluation of health 2.3 Microeconomic tools for health economics 2.4 Statistical tools for health economics	5	3	0
3	**Cost effectiveness analysis** 3.1 Average cost-effectiveness ratio 3.2 Incremental cost-effective ratio 3.3Distributional cost-effectiveness analysis in addressing health equity and health inequalities 3.4 Case studies	2	1	0
4	**Cost- Utility Analysis** **4.**1 Disability Adjusted life years 4.2 Quality Adjusted life years Practical session with the WHO data sets for calculation of DALY and QALY	6	2	4
5	**Human capital Approach** 5.1 Grossman model	6	2	

	5.2 Cost of Illness			
6	**Health impacts from Air and water pollution** 6.1 Types of data and specifications used- 6.2 Quantification of health impact of outdoor and indoor air pollution applying several methodologies. 6.3 Quantification of health impacts of water pollution applying the methodologies	6	2	
7	**Climate change and health impacts** 7.1 Climate change and health – vector borne and water borne diseases 7.2 Methodologies used for addressing climate change and health impacts	8	2	
8	**Impact evaluation of policies in the area of environmental health** Case studies from low and middle-income countries	4		
	Total	41	13	4

Evaluation criteria:

- **Test 1**: Written test [end of module 1 and 2] - 10%
- **Test 2**: Assignments [end of module 3 and 4] -30%
  - I. Assignments will be given as an individual or group to judge the clarity of the methods they have learnt and its area of application
  - II. The structure of submission: Research question, Outline of the methodology, data source, and interpretation of results.
  - III. Indicators of assessment: content and structure and quality of the report (weightage: 80%); presentation of the report in the class (weightage: 20%).
- **Test 3**:Term paper and presentation [end of all modules] - 30%
  - I. Students will be asked to write a term paper (in 5000 words) on a given topic.
  - II. The structure of submission: (i) Title and abstract (ii) Introduction (iii) Literature review (iv) Description of the issue that you will discuss and how it relates to the country you are studying(v) Discussion of the policies the government has enacted or plans to enact to address the problem and an analysis of those policies. (vi) Conclusion summarizing major points.
  - III. Indicators of assessment: (i) research question, (ii) maintaining word limit, (iii) content and clarity (iv) (v) adequate referencing.
- **Test 4**: Final exam [end of all the modules] :Written test - 30%

Learning outcomes: By the end of the course, students will:

- command on the foundations of the key concepts relating environment and health [test 1]
- develop competences with the tools and how to implement them [test 2]
- build confidence in writing term paper [test 3]
- understand linkages between environment and health, concepts, theoretical and methodological understanding with case studies and a brief overview of the health care incentives and financing. [test 4]

Pedagogical approach: Class interaction, teaching and discussion, group assignment, case studies presentation

Course Reading Materials (*=compulsory readings)

Module 1 - Introduction to environmental health

*Zweifel, Peter, Friedrich Breyer, and Mathias Kifmann. *Health economics*. Springer Science & Business Media, 2009

*Lopez, A. D., & Murray, C. C. (1998). The global burden of disease, 1990–2020. *Nature medicine*, *4*(11), 1241.

*Prüss-Üstün, A., Mathers, C., Corvalán, C., & Woodward, A. (2003). Introduction and methods: assessing the environmental burden of disease at national and local levels.

Forouzanfar, M. H., Afshin, A., Alexander, L. T., Anderson, H. R., Bhutta, Z. A., Biryukov, S., ... & Cohen, A. J. (2016)Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of

Disease Study 2015. *The Lancet*, *388*(10053), 1659-1724.
*Confalonieri, U., B. Menne, R. Akhtar, K.L. Ebi, M. Hauengue, R.S. Kovats, B. Revich and A. Woodward, 2007: Human health. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press.

Module 2 Economic evaluation of health

*Zweifel, Peter, Friedrich Breyer, and Mathias Kifmann. *Health economics*. Springer Science & Business Media, 2009.
Folland, S., Goodman, A. C., & Stano, M. (2007). *The economics of health and health care* (Vol. 6). Upper Saddle River, NJ: Pearson Prentice Hall

Module 3 Cost effectiveness analysis

*Folland, S., Goodman, A. C., & Stano, M. (2007). *The economics of health and health care* (Vol. 6). Upper Saddle River, NJ: Pearson Prentice Hall.
*Zweifel, Peter, Friedrich Breyer, and Mathias Kifmann. *Health economics*. Springer Science & Business Media, 2009.
*Raikou, M and McGuire, A. Measuring costs for cost-effectiveness analysis in Jones, A., editor The Elgar Companion to Health Economics, Cheltenham, Edward Elgar
Rudmik, L., & Drummond, M. (2013). Health economic evaluation: important principles and methodology. *The Laryngoscope*, *123*(6), 1341-1347.

*Cookson, Richard, Andrew J. Mirelman, Susan Griffin, Miqdad Asaria, Bryony Dawkins, Ole Frithjof Norheim, Stéphane Verguet, and Anthony J. Culyer. "Using cost-effectiveness analysis to address health equity concerns." *Value in Health*20, no. 2 (2017): 206-212.

Asaria, Miqdad, Susan Griffin, and Richard Cookson. "Distributional cost-effectiveness analysis: a tutorial." *Medical Decision Making* 36, no. 1 (2016): 8-19.

Ramachandran, A., Snehalatha, C., Yamuna, A., Mary, S., & Ping, Z. (2007). Cost-effectiveness of the interventions in the primary prevention of diabetes among Asian Indians: within-trial results of the Indian Diabetes Prevention Programme (IDPP). *Diabetes Care*, *30*(10), 2548-2552.
Goldie, S. J., Sweet, S., Carvalho, N., Natchu, U. C. M., & Hu, D. (2010). Alternative strategies to reduce maternal mortality in India: a cost-effectiveness analysis. *PLoS medicine*, *7*(4), e1000264.
Rose, J., Hawthorn, R. L., Watts, B., & Singer, M. E. (2009). Public health impact and cost effectiveness of mass vaccination with live attenuated human rotavirus vaccine (RIX4414) in India: model based analysis. *Bmj*, *339*, b3653.

Module 4 Cost- Utility Analysis

Folland, S., Goodman, A. C., & Stano, M. (2007). *The economics of health and health care* (Vol. 6). Upper Saddle River, NJ: Pearson Prentice Hall.
*Zweifel, Peter, Friedrich Breyer, and Mathias Kifmann. *Health economics*. Springer Science & Business Media, 2009.
*Sassi, F. (2006). Calculating QALYs, comparing QALY and DALY calculations. *Health policy and planning*, *21*(5), 402-408.
*Anand, S., & Hanson, K. (1997). Disability-adjusted life years: a critical review. *Journal of health economics*, *16*(6), 685-702.
Simoens, S. (2010). Health economic assessment: cost-effectiveness thresholds and other decision criteria. *International journal of environmental research and public health*, *7*(4), 1835-1840.
Murray, C. J., Vos, T., Lozano, R., Naghavi, M., Flaxman, A. D., Michaud, C., ... & Aboyans, V. (2012).

Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *The lancet*, *380*(9859), 2197-2223.

Module 5- Human capital Approach

*Grossman, M. (1972). On the concept of health capital and the demand for health. *Journal of Political economy*, *80*(2), 223-255.

*Zweifel, Peter, Friedrich Breyer, and Mathias Kifmann. *Health economics*. Springer Science & Business Media, 2009

Module 6 - Health impacts from Air and water pollution

Air pollution

Smith, K. R. (2000). National burden of disease in India from indoor air pollution. *Proceedings of the National Academy of Sciences*, *97*(24), 13286-13293.

Smith, K. R., & Mehta, S. (2003). The burden of disease from indoor air pollution in developing countries: comparison of estimates. *International journal of hygiene and environmental health*, *206*(4-5), 279-289.

*Arcenas, A., Bojö, J., Larsen, B. and R. Ñunez, Fernanda (2010):The Economic Costs of Indoor Air Pollution: New Results for Indonesia, the Philippines, and Timor-Leste, Journal of Natural Resources Policy Research, 2: 1, 75 — 93

Calthrop, E., & Maddison, D. (1996). The dose—response function approach to modelling the health effects of air pollution. *Energy Policy*, *24*(7), 599-607

*Chay, K. and Greenstone, M. 2003. The Impact of Air Pollution on Infant Mortality: Evidence from Geographic Variation in Pollution Shocks Induced by a Recession, Quarterly Journal of Economics

*Cropper, M. L., Simon, N. B., Alberini, A. and Sharma, P.K. 1997. The Health Effects of Air Pollution in Delhi, India (December). World Bank Policy Research Working Paper

*Ostro, B. D., 1983. The effects of air pollution on work loss and morbidity, Journal of Environmental Economics and Management, Vol. 10(4)

*Ransom, M. and C. A. Pope. 1995. External Health Costs of a Steel Mill. Contemporary Economic Policy, 13.

*Hubbell, B. J. 2006. Implementing QALYs in the Analysis of Air Pollution Regulations, Environmental and Resource Economics, 34(3), 34:365–384

Water Pollution

*Clasen, T. F. and L. Haller. 2008. Water Quality Interventions to Prevent Diarrhoea: Cost and Cost-Effectiveness, Public Health and the Environment, World Health Organization,

*Harrington, W., & Portney, P. R. (1987). Valuing the benefits of health and safety regulation. *Journal of urban Economics*, *22*(1), 101-112.

Dasgupta, P. 2004. Valuing health damages from water pollution in urban Delhi, India: A production function approach, Environment and Development Economics 9 (1)

Pattanayak, S. K., Yang, J. C., Whittington, D., & Bal Kumar, K. C. (2005). Coping with unreliable public water supplies: Averting expenditures by households in Kathmandu, Nepal. *Water Resources Research*, *41*(2).

Hutton, G., L. Haller, J. Bartram. 2007. Economic and health effects of increasing coverage of low-cost household drinking-water supply and sanitation interventions to countries off-track to meet MDG target.

Module 7 Climate change and health impacts

Bosello, F., Roson, R., Tol, R. S. (2006). Economy-wide estimates of the implications of climate change: Human health. *Ecological Economics*, *58*(3), 579-591.

*Markandya, A and A. Chiabai. 2009. Valuing Climate Change Impacts on Human Health: Empirical Evidence from the Literature, International Journal of Environmental Research and Public Health, 6, 759-786

*Deschenes, O., M. Greenstone and J. Guryan. 2009. Climate Change and Birth Weight, American Economic Review Papers and Proceedings, 99(2)

* Kumar, R., P. Jawale and S. Tandon. 2008. Economic impact of climate change on Mumbai, India Regional Health Forum, Volume 12, Number 1.

*Sachs, J. & P. Malaney. 2002. The Economic and Social burden of Malaria, Nature 415, 680-685 (7 February 2002)

*Vogel, L., Hey, J. V., Faria, S. H., Spadaro, J. V. (2015). *Health impacts of atmospheric pollution in a*

changing climate(No. 2015-03).
*Trærup, S. L., Ortiz, R. A., Markandya, A. (2010). The health impacts of climate change: a study of Cholera in Tanzania.
Patz, J. A., Campbell-Lendrum, D., Holloway, T., Foley, J. A. (2005). Impact of regional climate change on human health. *Nature*, *438*(7066), 310.
McMichael, A. J., Woodruff, R. E., Hales, S. (2006). Climate change and human health: present and future risks. *The Lancet*, *367*(9513), 859-869.

Module 8 –

*Liu, Hai-Ying, Alena Bartonova, Mathilde Pascal, Roel Smolders, Erik Skjetne, and Maria Dusinska. "Approaches to integrated monitoring for environmental health impact assessment." *Environmental health* 11, no. 1 (2012): 88.
*Pattanayak, Subhrendu K. *Rough guide to impact evaluation of environmental and development programs*. SANDEE, 2009.
*R E Glasgow, T M Vogt, and S M BolesAMC Cancer Research Center, Denver, CO 80214, USA. glasgowr@amc.org "Evaluating the public health impact of health promotion interventions: the RE-AIM framework.", *American Journal of Public Health* 89, no. 9 (September 1, 1999): pp. 1322-1327.
Ferraro, Paul J. "Counterfactual thinking and impact evaluation in environmental policy." *New Directions for Evaluation* 2009, no. 122 (2009): 75-84.
Lagarde, Mylene, Andy Haines, and Natasha Palmer. "Conditional cash transfers for improving uptake of health interventions in low-and middle-income countries: a systematic review." *Jama* 298, no. 16 (2007): 1900-1910.
Bryce, Jennifer, Cesar G. Victora, Jean-Pierre Habicht, J. Patrick Vaughan, and Robert E. Black. "The multi-country evaluation of the integrated management of childhood illness strategy: lessons for the evaluation of public health interventions." *American journal of public health* 94, no. 3 (2004): 406-415
Rocha, Romero, and Rodrigo R. Soares. "Evaluating the impact of community-based health interventions: evidence from Brazil's Family Health Program." *Health economics* 19, no. S1 (2010): 126-158.
Chapter 5- Health policy making and planning in Collins, Charles, and Andrew Green. *Valuing health systems: A framework for low and middle income countries*. SAGE Publications India, 2014.

Advanced Reading Material

Additional information (if any): Journals
Lancet, Journal of health economics, PLOS ONE.

Student responsibilities: Attendance, feedback, discipline: as per University rules.

Prepared by: Sukanya Das

Course reviewers:

1. Prof Indrani Gupta, Professor and Head, Health Policy Research Unit (HPRU),, Institute of Economic Growth, New Delhi
2. Prof Indrani Roy Chowdhury, Associate Professor (Economics),Centre for the Study of Regional Development (CSRD),JNU, New Delhi.

Comments by Board of Studies and Action Taken thereof, if any.

Comments	Response
1. Course objectives needs clarity. Thorough knowledge of environmental health may be included. What does "environmental health" mean? Are we interpreting this as effect of environment on human health or the health of environment?	Incorporated (objective 1)
2. Case study method might be helpful.	Case study will be incorporated across modules

3. Risk assessment is important	It is embedded within modules

Course title: Microeconomics-II			
Course code: MPE 137	**No. of credits: 4**	**L-T-P: 56-0-0**	**Learning hours: 56**
Pre-requisite course code and title: MPE 131 Microeconomics; MPE 113 Mathematical Methods for Economics			
Department: Department of Policy Studies			
Course coordinator: TBD	**Course instructor** TBD		
Contact details:			
Course type: Elective	**Course offered in:** Semester 3		

Course description:

Standard Microeconomic theory claims that price-taking behaviour results in efficient market outcomes under assumptions like rational preferences, certainty of outcomes and complete information. This course recognizes possibility of market failure, i.e., inefficient market outcomes, when one or more of these assumptions are relaxed. It explores the special requirements for designing institutions like insurance, contracts, law, voting, auctions and matching to meet the challenge of market failure.

Course objectives:

1. To understand the role of asymmetric information and non-standard preferences in the failure of markets and other institutions
2. To appreciate the role of alternative axioms in characterizing solutions to institutional failure problems
3. To apply axiomatic theory for characterizing different solutions to institutional failure problems

Course contents

S.No	Topic	L	T	P
1	**Module 1: Flashback and Overview** • Recap of standard Microeconomic theory: individual decision-making and general equilibrium • Overview of the course • Axioms and their role in Microeconomics	2		
2	**Module 2: An uncertain world** • Expected Utility Theorem, Measures of Risk Aversion; Application: Insurance • General Equilibrium under uncertainty; Asset Markets; Application: Emission trading markets	8		
3	**Module 3: Lemons and Shirking** • Market for lemons; the screening problem; Application: the problem of a discriminating monopolist vs. the optimal auction problem • Moral hazard; optimal incentive schemes; Application: underdeveloped agriculture • Signalling; Application: signalling in job markets • General application: auctions vs. negotiations for coal blocks	10		
4	**Module 4: Law and Economics** • Coase and Transaction Cost approach; Coase on Federal Communication Commission and auctions for natural resources • Brief overview of law and economics	6		
5	**Module 5: Taking people along: social choice** • Aggregation of individual preferences; Condorcet Paradox; Arrow's Impossibility Result; Single-peaked preferences and other restrictions; Median Voter Rules • Strategic Social Choice: Gibbard-Satterthwaite	10		

	Theorem; Nash Implementation; strategic social choice when outcomes are lotteries			
6	**Module 6: Design your own market** • Mechanism design with money: Optimal auction, VCG , double auctions; Application: mechanism design for land assembly • Mechanism design without money: marriage market and the Gale-Shapley algorithm; house allocation problem and the Shapley-Scarf algorithm • Applications: school choice, kidney exchange	10		
7	**Module 7: Cooperative Games and Networks** • Bargaining Solutions: Nash solution, Core and Shapley Value; Applications to resource sharing problems • Economics of social networks: stability vs efficiency, network formation games.	10		
	Total	**56**		

Evaluation criteria:
Test 1: Submission and oral presentation of a Term Paper (at the end of Module 7) 40%
Test 2: Written Examination (at the end of Module 4) 30 %
Test 3: Written Examination (at the end of Module 7) 30 %

Learning outcomes:
On completion of this course, the students would:

1. Understand the nature of different forms of market failure and theoretical responses to such market failure (Test 2)
2. Understand collective decisionmaking processes and their properties in an axiomatic framework (Test 3)
3. Be able to conceptualize and resolve simple problems of market/institutional failure (Test 1)

Pedagogical approach:
Standard classroom teaching followed by problem solving sessions; classroom experiments.

Materials:
Lecture Notes will be provided.
Suggested readings
Required:

1. Mas-Colell, Andreu, Michael Dennis Whinston, and Jerry R. Green.Microeconomic theory. Vol. 1. New York: Oxford university press, 1995.
11. Bergin, James. Microeconomic theory: a concise course. Oxford University Press, 2005.

Additional:

1. LeRoy, Stephen F., and Jan Werner. Principles of financial economics. Cambridge UniversityPress, 2001.
2. Salanié, Bernard. The economics of contracts: a primer. MIT press, 2005.
3. Laffont, Jean-Jacques, and David Martimort. The theory of incentives: the principal-agent model. Princeton University Press, 2009.4. Bolton, Patrick, and Mathias Dewatripont. Contract theory. MIT press, 2005.
5. Coase, Ronald Harry. The firm, the market, and the law. University of Chicago press, 2012.
6. Gaertner, Wulf. A Primer in Social Choice Theory: Revised Edition: Revised Edition. Oxford University Press, 2009.
7. http://alsamixer.files.wordpress.com/2013/03/iisclectures2.pdf

8. Krishna, Vijay. Auction theory. Academic press, 2009.
9. Peleg, Bezalel, and Peter Sudhölter. Introduction to the theory of cooperative games. Vol. 34.Springer, 2007.
10. Goyal, Sanjeev. Connections: an introduction to the economics of networks. Princeton University Press, 2012.

Additional information (if any):

Student responsibilities: Attendance, feedback, discipline: as per university rules.

Course reviewers:

This course was reviewed by

1. Prof Debasis Mishra, Indian Statistical Institute, New Delhi
2. Prof Priyodarshi Banerjee, Indian Statistical Institute, Kolkata

Comments by Board of Studies and Action Taken thereof, if any.

Comments	Response
1. Some classroom experiments may be added	Classroom experiments have been added to pedagogy.
2. Markets in emission trading and understanding the volatility of these markets	Emission trading markets has been included as a topic in module 2
3. Commodity Derivative Markets may be included. Parallels between biological systems and market systems may be considered	Partly covered in Module 2.
4. The logic of increase in the hours must be explained.	Additional topics have been mentioned to justify the increase in teaching hours
5. Review objectives of the course.	Course objectives have been made more specific.
6. Link with environment and resource economics may be considered.	Embedded in various applications

Course title: Labour Economics			
Course code: MPE 174	**No. of credits:** 4	**L-T-P:** 56-0-0	**Learning hours:** 56
Pre-requisite course code and title (if any): 10+2 level knowledge of Mathematics and Macroeconomics (MPE 121)			
Department: Department of Policy Studies			
Course coordinator: TBD	**Course instructor** TBD		
Contact details:			
Course type: Elective	**Course offered in:** Semester 3		

Course description:

The course discusses contributions of labour in the process of economic development. It locates, historically, changes in the nature of work at different phases of development. Students in this course will get exposed to macroeconomic theories of wages and analysis of labour markets. Further, it incorporates the political economy analysis of labour in the process of production in rural and urban settings with an emphasis of informalisation. The course also brings into discussion the contribution of labour in promoting sustainable rural livelihoods in the non-farm sector through the implementation of the MGNREGS. Students will be acquainted with the relationship between gender and the institution of caste in the processes of production. Impacts of contemporary globalisation on labour and contemporary debates on flexibility of Indian labour laws, incorporating the role of state which is a direct fall out of globalisation, is covered in the course as well.

Course objectives:

- To understand history of work, functioning of labour markets and determination of wage.
- To acquaint students with diverse labour relations in urban and rural settings.
- To understand the role of labour in creating resilience of rural households to different climate shocks.
- To acquaint students with the relationships between gender and labour and caste and labour.
- To understand the relationship between current phase of globalisation and labour while incorporating the role of Indian state.

Course contents

S. No	Topic	L	T	P
1	Meaning/concept of labour	3		
2	Labour markets and theories of wage -Classical, New Keynesian, Keynesian, and search friction frameworks	12		
3	Agrarian relations and labour in rural India -Evolution of the class of agricultural labourers in India -Agrarian relations and labour contracts: A theoretical perspective -Non-farm sector and rural labour	13		
4	Urban informal labour -Migration from the villages to cities and the growth of informal workforce -Livelihood situation of urban informal labour	8		
5	Gender, caste and labour -Accounting of women's work under patriarchy	10		
6	State, globalisation and labour -The role of state in a globalised world and the emergence and growth of an informal sector -Labour market regulations and its impacts on employment and industrial performances	10		
	Total	**56**		

Evaluation criteria:

1. **Test 1: Written test** [after the completion of modules 1 and 2] – 20%
2. **Test 2: Submission of a term paper** [after the completion of module 3] – 30%
   Students will be asked to write an essay (in 2000 words) on a given topic. They will be assessed based on (a)

answering the question, (b) maintaining word limit, (c) in-depth understanding of the topic, (d) strength of argument, (e) clarity of argument and (f) proper referencing.

3. **Test 3: Presentation** [after the completion of module 5] – 20%
   There will be individual presentation of students based on the topics covered in the course. Topic(s) will be related to the modules covered in the course.
4. **Test 4: Written test** [at the end of the semester, entire syllabus] – 30%

Learning outcomes:

-Students will develop a critical understanding regarding history of work and theory of wages [test 1]
-Command in-depth understanding regarding rural and urban labour. Students will also able to critically understand how the social constructs like gender and caste impacts labour [tests 2 and 3]
-Students will develop an understanding of labour as social relations of production that will enable them to locate it in that perspective rather than locating labour simply as a factor of production [test 4]

Pedagogical approach:

-- Key importance of class interactions and discussions.
-- Presentations by students

Materials:

Optional textbooks:

1. Keynes, J. M. (1935). *The General Theory of Employment, Interest and Money*. Atlantic Publishers and Distributors (P) Ltd, New Delhi, India.
2. Akerlof, G. A and J. L. Yellen. (1986). *Efficiency Wage Models of the Labour Market*. Cambridge University Press.
3. Chakravarty, S. (ed.) (1990). *The Balance between Industry and Agriculture in Economic Development: Volume 3*, Manpower and Transfers. Macmillan Press, London.
4. Banerjee, D. and Goldfield, M. (eds.) (2007). *Labour, Globalisation and the State: Workers, Women and Migrants Confront Neoliberalism*. Routledge, London and New York.
5. Marx, K. (1976). *Wage, Labour and Capital & Value, Price and Profit*, International Publishers, New York.
6. Khera, R (2011). *The Battle for Employment Guarantee*, Oxford University Press, New Delhi.
7. Roychowdhury, A (2018). *Labour Law Reforms in India: All in the Name of Jobs*, Routledge, London and New York.

Module I. Meaning/concept of labour

Bhattacharya, Sabyasachi (2014). "Introduction", in Bhattacharya, S. (ed.), *Towards a New History of Work*, Tulika Books, New Delhi, India.
Edgell, Stephen (2012). "The Transformation of Work: From Work as an Economic Activity to Work as Employment" (Chapter 1) in *The Sociology of Work: Continuity and Change in Paid and Unpaid Work*. Sage Publications Ltd.
[Through these readings students will be able to understand the transformation of work with development of capitalism and related changes in production relations]

Module II. Labour Markets and theories of wage

Smith, Stephen (2003). "Wage Determination and Inequality" (Chapter 3) in *Labour Economics 2nd edition*, Routledge, London and New York.
[Classical understanding of wage determination in the labour market]

Shapiro, Carl and Joseph, Stiglitz (1986). "Equilibrium Unemployment as a Worker Discipline Device" in Akerlof, G. A and J. L. Yellen (eds.), *Efficiency Wage Models of the Labour Market.* Cambridge University Press.
[New-Keynesian understanding of wage determination in the labour market]

Keynes, J. M. (1935). "Changes in Money Wages" (Chapter 19) in *The General Theory of Employment, Interest and Money.* Atlantic Publishers and Distributors (P) Ltd, New Delhi, India.
[Keynesian understanding of wage determination in the labour market]

Marx, K. (1849). *Wage, Labour and Capital & Value, Price and Profit* (Chapter 2-7).
[Marxian understanding of wage determination and relation of wage-labour to capital]

Bowles, Samuel and Herbert, Gintis (1990). "Contested Exchange: New Micro-foundations for the Political Economy of Capitalism", *Politics and Society*, 18(2).
[Analyses the political economy relationship between the employers and workers with a model of contested exchange]

Mortensen, Dale T. (2011). "Markets with Search Friction and the DMP Model", *American Economic Review*, 101(4).
[Analyses the roles that search, and frictions play in the functioning of labour markets.]

Module III. Agrarian relations and labour in rural India

- **Evolution of the class of agricultural labourers**

Patnaik, Utsa (1983). "On the Evolution of the Class of Agricultural Labourers in India", *Social Scientist,* 11(7).
[This paper analyses economic processes that had led to the creation of agricultural labourers in India]

- **Rural labour relations in India**

Dreze, Jean. P. and Mukherjee, Anindita (1990). "Labour Contracts in Rural India: Theories and Evidence", in Chakravarty, Sukhamoy (1990). *The Balance Between Industry and Agriculture in Economic Development: Volume 3, Manpower and Transfers*. Macmillan Press, London.
Mohan Rao, J (1999). "Agrarian Relations and Unfree Labour in Byres", T. J. et. al (eds.). *Rural Labour Relations in India,* Routledge, London and New York.
[These two readings provide theoretical analysis of labour relations in rural India]

- **Labour in the rural non-farm sector**

Himanshu et. al. (2011). *Non-Farm Diversification and Rural Poverty Decline: A Perspective From Indian Sample Survey and Village Study Data,* Working Paper no. 44. LSE Asia Research Centre. London, United Kingdom.
[This paper analyses occupational diversification in the rural areas of India and its importance in ensuring livelihood security to the workers]

Dreze, J. (2011). "Employment Guarantee and the Right to Work", in Khera (ed.) *The Battle for Employment Guarantee*, Oxford University Press, New Delhi.
[Analyses history and the debates related to the NREGA, an important component of rural non-farm jobs.]

Steinbach, Dave et al (2017). *Building Resilience to Climate Change: MGNREGS and Drought in Jharkhand*, Issue Paper, International Institute for Environment and Development, London, United Kingdom
[Analyses role of the MGNREGS in creating resilience of rural households to different climate shocks]

Tiwari, Rakesh et al (2011). "MGNREGA for Environmental Service Enhancement and Vulnerability Reduction: Rapid Appraisal in Chitradurga District, Karnataka", *Economic and Political Weekly*, 46(20).
[This paper examines and assesses the environmental implications of the activities implemented under the NREGA]

Module IV: Urban informal labou

- **Types and nature of Informalisation**

Standing, Guy (2011). "The Pracariat" (Chapter 1) in *The Precariat: The New Dangerous Class*, Bloomsbury Academic, London and New York.
[Students will be able to understand that the informal sector is being considered as being excluded, a catastrophe under capitalism rather than its normal functioning.]

Bhattacharya, Saumyajit (2018). "Comprehending the 'in-formal': Formal-Informal Conundrum in Labour under Capitalism" (Chapter 11) in Ghosh Dastidar, Ananya, Malhotra, Rajeev and Suneja, Vivek (eds.). *Economic Theory and Policy Amidst Global Discontent: Essays in Honour of Deepak Nayyar*. Routledge. London and New York.
[Through this reading the students will be able to understand that informality is not the 'other' but which is always present in strategies of capital which labour fights for contesting and negotiating subjugation.]

- **Urban informal sector in India**

Breman, Jan (1996). "Inflow of Labour into South Gujarat (Chapter 3)", in *Footloose Labour: Working in India's Informal Economy* (1996), Cambridge University Press, London.
[Explains the widely prevalent phenomena of migration from villages to towns and conditions of employment of informal workers]

NCEUS (2007). "Towards Protection and Promotion of Livelihoods of Unorganised Workers (Chapter 12)", in the *NCEUS Report on Conditions of Work and Promotion of Livelihoods in the Unorganised Sector* (2007), Government of India, New Delhi.
[This government report analyses economic situation of informal workers and measures to enhance their livelihood security]

Module V: Gender, caste and labour

- **Gender and labour**

Beneria, Lourdes (1992). "*Accounting for Women's Work: The Progress of Two Decades",* World Development, 20(11), pp. 1547-1560.

Banerjee, Nirmala (1999). "Analysing Women's Work Under Patriarchy" in Sangari, Kumkum and Chakravarti, Uma (eds.) (1999), *From Myths to Markets: Essays on Gender*, Indian Institute of Advanced Study, Shimla and Manohar Publishers and Distributors, New Delhi, India.
[These papers will enable the students to understand the problems in measuring women's work. It will also enable them to understand women's work under patriarchy.]

Hirway, Indira and Jose, Sunny (2011). "Understanding Women's Work Using Time-Use Statistics: The Case of India", *Feminist Economics,* 17(4).
[The paper shows that the time use surveys has built-in advantages that lead to improved estimates and understanding of the workforce.]

- **Caste discrimination and labour**

Thorat, Sukhadeo (2008). "Labour Market Discrimination: Concept, Forms and Remedies in the Indian Situation", *The Indian Journal of Labour Economics*, 51(1).
[This paper discusses forms of discrimination that exist against vulnerable social groups in the Indian labour market]

Ito, Takahira (2009). "Caste Discrimination and Transaction Costs in the Labour Market: Evidence from Rural North India", *Journal of Development Economics,* 88(2).
[The paper discusses existence of transaction costs against backward castes regarding access to regular employment].

Module VI: State, globalisation and labour

- **An overview of the relationship between the labour and state in contemporary globalisation**

Banerjee, Debdas and Goldfield, Michael (2007). Neoliberal globalization, labour and the state in Banerjee, Debdas

and Goldfield, Michael (eds.) (2007), *Labour, Globalisation and the State: Workers, Women and Migrants Confront Neoliberalism*. Routledge, London and New York.
[Analyses the contemporary nature of development and the role of state vis-à-vis labour]

- **Globalisation and informalisation of labour**

Sanyal, Kalyan and Bhattacharya, Rajesh (2009). "Beyond the Factory: Globalisation, Informalisation of Production and the New Locations of Labour", *Economic and Political Weekly*, 44(22).
[Analyses changes in the conditions of employment with the current phase of globalization]

Roy, Satyaki (2014). Informality' and Neo-liberalism: Changing Norms and Capital's Control in Kannan et al (eds.) *Labour and Development: Essays in Honour of Professor T. S. Papola,* Academic Foundation, New Delhi-215-234.
[This paper questions the notion of 'informality' as a transitory feature of the development process.]

- **Analysing labour market reforms in India**

NCEUS (2009). "Labour Law Reforms: Beyond a Narrow Agenda (Chapter 7)", in *The Challenge of Employment in India: An Informal Economy Perspective,* Government of India, New Delhi.

Roychowdhury, Anamitra (2018). "A Critical Examination of the Labour Market Flexibility Debate in India" (Chapter 2), *Labour Law Reforms in India: All in the Name of Jobs*, Routledge, London and New York.
Bhattacharjea, Aditya (2006). "Labour Market Regulation and Industrial Performance in India: A Critical Review of the Empirical Evidence", *The Indian Journal of Labour Economics*, 49(2).
[These three readings critically examine the nature of reforms in labour laws, whether these reforms are beneficial for the workers employed informally, thereby leading to overall increase in employment and industrial development.]
Additional information (if any):

Student responsibilities: Attendance, feedback, discipline: as per university rules.

Course Reviewers:

- Professor Sumangala Damodaran, School of Development Studies, Ambedkar University Delhi.
- Dr. Satyaki Roy, Associate Professor, Institute for Studies in Industrial Development, Vasant Kunj, New Delhi.

Prepared by: Dr. Shantanu De Roy

Comments by Board of Studies and Action Taken thereof, if any.

Comments	Response
1. Policies of Globalization is not clear.	In Economics, globalisation indicates greater integration with the global economy. The term 'globalisation' is widely used in the literature of Economics and various other Social Science courses. It implies policies that had led to greater integration into the world economy. In Labour Economics, a module (Module 6) has been designed specifically to discuss the debates that have emerged regarding labour relations following India's (greater) integration into the world economy after the nineties. In this context, the role of the state has also been analysed.
2. Module 2: search and friction framework may be included.	This suggestion has been accepted. A paper by Dale T. Mortensen (Markets with Search Friction and the DMP Model) has been incorporated.
3. Empirical techniques like	A paper using the Time Use Survey has been incorporated in

duration analysis, time use surveys.	Module 5 (Gender and Labour) in the revised course outline. Title of the Paper: Under Women's Work Using Time-use Statistics: The Case of India (Indira Hirway and Sunny Jose).
4. Overlap with Development Economics	In my humble opinion, there is no overlap with Development Economic in terms of issues that are being covered and readings related to informal labour (Modules 4 and 6). There is some similarity in the broad topics, yet, discussions are completely different. For example, in Development Economics, Kanbur, Ravi (2009) (Conceptualising Informality: Regulation and Enforcement) argues informality (and formality) in the framework of regulations and enforcements of those; Maity and Mitra (2010) (Skills, Informality and Development) analyses informal sector employment in the contexts of wage-gap in the informal sector and revenue and development expenditures incurred by the government. However, the papers on informal labour used in Labour Economics deals with various other discourses of informality (duality of the economy, precariousness of informal work and emergence of a dangerous class of 'precariats', the larger political and economic issues related to informality, caste compositions of the informal workers who are primarily landless, labour relations of informal workers and globalisation and the associated process of informalization in the labour market that had led to worsening of the conditions of labour). In my view, there is no *one way* in which informality in the labour market can be analysed and taught and hence there is *no* overlap with Development Economics. There is overlap in the topic related to social identity and wage discrimination in the labour market in India (Module 5). Papers by Madheswaran, S and P. Attewell (Caste Discrimination in the Urban Indian Labour Market: Evidence from the National Sample Survey, used in Development Economics) and Duraisamy, P. and Duraisamy, M (Social Identity and Wage Discrimination in the Indian Labour Market, used in Labour Economics) by and large deals with similar issues. The paper by Duraisamy, P. and Duraisamy, M. has been replaced with the paper by Ito, T. (Caste Discriminations and Transaction Costs in the Labour Market: Evidence from Rural North India) that analyses existence of transaction costs and discrimination against socially backward castes in getting access to regular employment. The findings of this paper suggest that caste-based discrimination takes the form of *job-discrimination rather than wage-discrimination* in the labour market.
5. State related topics may be covered earlier in the course.	In my view, it is not needed.
6. Module 5: no caste mentioned in the descriptions. The side headings in the modules and syllabus don't match.	It has been incorporated in the revised syllabus.

7. Faculty may reflect on the following: What happens after a faculty raise an argument? How to close the loop as well.	For reflection, no action required.

Course title: Applied Quantitative Data Analysis in Development Practice

Course code: MPD 113	**No. of credits: 3**	**L-T-P: 20-14-08**	**Learning hours: 42**

Pre-requisite course code and title (if any):

- MPD102- Group Practicum - from where students carry their own data sets collected from the field.
- MPD111- Quantitative Analysis for Development Practice - from where students are already familiar with basic statistics

Department: Department of Policy Studies

Course coordinator(s): TBD	**Course instructor(s):** TBD

Contact details:

Course type: Elective	**Course offered in:** 3rd Semester

Course description

The basic premise of this course lies in developing a set of skills among students for quantitative data analysis for programme and policy design. MA-SDP students collect an enormous amount of data during the course (MPD 102), which is designed for a community needs assessment. While some of these data are analysed by the students using preliminary techniques, hands-on experience in developing a dataset based on the information collected from the community and analysing them using advanced statistical techniques help students complete an entire process of an independent study. This training can also be useful in applying such techniques on large-scale datasets such as National Family Health Survey (NFHS), India Human Development Survey (IHDS), National Sample Survey (NSS), etc. that are already collected by different agencies and which is widely used in the area of development planning.

Learning objectives:

- To provide students a practical overview of survey data processing, exploration, and analyses
- To enable students conducting advanced statistical analysis on the large-scale survey data using statistical software
- To enable students independently conceptualize a study satisfying a development inquiry, analyse the respective research questions using available secondary data, interpret and professionally document the findings

Course content

Module	**Topic**	**L**	**T**	**P**
1.	**Introduction** This module will hone in on illustrations of quantitative data analyses and their ability to facilitate decision-making in development practice. Discussions will also be made on the select large-scale survey data available to use for satisfying development-oriented inquires in Indian context.	4		
2.	**Data Processing and Exploration** Data processing starts with selecting a data collection strategy and ends when data transformations are complete. This module will provide an overview of the survey data processing and data exploration along with the practical exercises using the group surveys conducted by the students in the 2nd semester. The tutorial will cover the following aspects: • Creating data files using statistical software (STATA) • Transforming data into variables useful for analysis • Translating the data across formats • Modifying data files (collapse, merge, append and reshape) • Describing the data – summarizing and tabulating the variables with	8	2	4

	descriptive statistics • Presenting data with graphs • Formatting the output tables (publication quality tables) using STATA			
3.	**Conceptualization and Data Analyses** This module will focus on the process and nuances of conceptualizing an analytical framework for a research study. In addition, discussions will be made on the analytical procedures, estimation of sample statistics, statistical tests and model-building using survey data. This module will cover the following topics: • Research Hypothesis and Analytical Framework • Tests for One-way and Two-way tables (Tests for Goodness of fit, Independence, and Homogeneity) • Types of Multivariate Models (ANOVA-type, regression-type, ANCOVA-type) • Logit and Linear models for proportions • Model Building • Adjustment of survey-design	8	4	
4.	**Analysis of Small Sample Surveys** Application of statistical tools and techniques for small sample size datasets: sample distribution, mean, standard deviations, standard error and confidence interval, tests for mean/proportion, correlation. In the practical session, students will be required to apply the knowledge gained in this and previous modules to structure the data and address problems in the data set, if any. Students will be given exposure to common errors in data processing and analysis as well as specific to their survey data collected from the field. They will be required to undertake exercises related to both data structuring and data cleaning.		2	4
5.	**Analysis of Large-Scale Surveys for Development Inquiries** Students will explore and analyse the Large-scale survey data based on well-defined study objective(s) linked to development and sustainability issues including education, health, water and sanitation, gender, socioeconomic and regional differences in development indicators etc. The tutorial session will focus on understanding salient aspects of large-scale surveys (NFHS, IHDS, NSS): sampling, stratifications, unit of analysis, the concept of data hierarchy. This will also include analysis of large-scale survey: bi-variate and multi-variate associations, regression (linear and logit regression) models applicable to the specific study. Students will be required to carry out an analysis of the data set complete in all respect using appropriate software. Different elements of analysis will be clearly delineated and documented in the form of a small research study based on secondary data.		6	8
		20	**14**	**16**

Evaluation criteria:

Course grades will be based on the following criteria:

- **Test-1:** Written (along with Computer Practical) Test: 20%; as a part of a mid-course evaluation under each Programme by the University in terms of intermediary minor tests, the candidates will be evaluated attending a written test. The structure of the minor test usually follows short-answer type questions, which would cover the initial two modules of the course. This minor test would share one-fifth of the total marks required for evaluating the candidates under this course. The test will be conducted after the completion of modules 1-2.
- **Test-2:** Presentation based on analysis of Group-Survey data and a brief report of findings: 20% (mid-semester)
- **Test-3:** Term paper: 50% (at the end of semester/14 weeks from the beginning) Details: A term paper will be submitted by the students. This will be based on a select topic focusing specific development issue using large-scale survey data analysis. The term paper will have a word limit

of 3000-4000. The guideline on structure and content of the term paper is given below:
(1) Introduction: background and rationale of the study, existing research gaps;
(2) Methodology: conceptual framework, source of data, measures, hypothesis (if any), statistical analysis;
(3) Results: sample distribution, bivariate and multivariate results;
(4) Discussion: relevance of study findings in the context of existing knowledge, policy implications, strength and limitations of the study and future scope.

- **Test-4:** Presentation based on the Term paper: 10% (end of the semester)

Learning outcomes

Upon completion of this course, students would be able to:

1. create datasets using raw data collected during the primary survey in the community and analyze them with a well-defined objective.
2. use appropriate statistical techniques/methods based on the nature of data: Application of appropriate statistical techniques will be assessed based on the evaluation of the brief report (based on Community Need Assessment Data) where students will be asked to apply suitable statistical techniques based on the nature of variables and sample size.
3. use large scale survey data in exploring different development inquiries ranging from problem identification to programme and policy design. The term paper will be based on current development challenges and how large-scale nationally representative surveys can be used to generate evidence and evaluate policies (Test 4).

Pedagogical approach

Interactive pedagogical style to maximize the learning opportunity through hands-on experience. Use of statistical package (STATA) for data processing and analysis.

Suggested readings

- Lehtonen R, Pahkinen E (2004). *Practical Methods for Design and Analysis of Complex Surveys*. West Sussex, England: John Wiley & Sons Ltd.
- Jarman KH (2013). *The Art of Data Analysis*. Hoboken, New Jersey: John Wiley & Sons, Inc.
- Acock AC (2014). *A Gentle Introduction to Stata, 4th Edition.* Texas: Stata Press.
- Minot N (2009). *Using Stata for Survey Data Analysis*. http://www.ifpri.org/publication/using-stata-survey-data-analysis
- International Institute for Population Sciences (IIPS) and ICF. 2017. *National Family Health Survey (NFHS-4), 2015-16: India*. Mumbai: IIPS.http://rchiips.org/nfhs/NFHS-4Reports/India.pdf
- Ministry of Statistics and Programme Implementation, Government of India. *National Sample Survey*. http://www.mospi.gov.in/national-sample-survey-office-nsso
- National Council of Applied Economic Research and the University of Maryland. *India Human Development Survey (IHDS), 2005. 2017*. doi:10.3886/ICPSR22626.v11 https://ihds.umd.edu/
- StataCorp. 2017. *Stata: Release 15*. Statistical Software. College Station, TX: StataCorp https://www.stata.com/manuals/r.pdf

Additional information:

Student responsibilities

Attendance: At-least 75% attendance will be required. Timely submission of assignment/project.

Course reviewers

1. Dr. Manoj Alagarajan, Department of Development Studies, International Institute for Population Sciences (IIPS), Mumbai.
2. Dr. Lucky Singh, Scientist-C, National Institute of Medical Statistics (NIMS), New Delhi.

Comments by Board of Studies and Action Taken thereof, if any.

Comments	Response
1. Tutorial number of hours need to be added.	The LTP numbers has been revised
2. Title: Should "Development Practice" be included in the title. If included, can the different character of the development practice be explained in the objective of the syllabus.	Reworded of the objective. Added a module on introduction. Accordingly renumbered and renamed modules
3. Terminology – elective instead of optional.	Changed the terminology to "Elective"
4. Add formatting the results (outputs and tables) using STATA	Added a component on presenting output in STATA